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COVER PICTURE

The Grand Parade at the
Perth Royal Show

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QUALITY or QUANTITY?

Recent trials have shown that late closing of hay paddocks on dairy farms gives higher quality hay, more winter grazing and a better balanced pasture.

The gain in quality more than compensates for any drop in yield.

By F. E. RYAN, Agrostologist, Dairying Division

CONSERVATION of hay on dairy farms has increased in recent years but so far emphasis has been on quantity rather than quality and in some districts paddocks are closed up very early to increase yields per acre of hay.

Some paddocks may be closed up for 16 weeks and periods of 12 to 14 weeks are not unusual. In a normal season, from six to seven weeks seems to be adequate for a reasonable hay cut. Hay cut after closing for this time usually has a higher proportion of leaf to stem and a greater nutritive value.

During 1960, the yields of hay from plots which had been closed up for various periods on two properties in the Denmark district were measured, and samples of the hay analysed.

The 1960 season was characterised by an exceptionally dry spring and hay cutting commenced much sooner than usual. The result was that hay yields were lower than would normally be expected.

EXPERIMENT 1

F. C. Smith, Denmark.

One such demonstration was conducted on the property of F. C. Smith, where sections of a paddock were progressively fenced off from grazing from May 16, June 28, August 1, September 3 and October 1, until all plots were cut for hay on Novem-

ber 8, 1960. The results are shown in the following table:—

TABLE 1.—YIELD AND CHEMICAL ANALYSES

Treatment	Yield of Hay	Analysis		
		Crude Protein	Crude Fibre	Nitrogen free extract
A. Closed	16/5/60	tons/ac.	%	%
B. "	28/6/60	1.9	7.5	31.9
C. "	1/8/60	2.1	7.5	32.3
D. "	3/9/60	2.9	10.2	28.0
E. "	1/10/60	1.7	14.3	23.9
		0.9	17.7	22.4
				53.0
				53.1
				52.7
				51.5
				49.6

Quality:

From the table it is obvious that there is a dramatic increase in percentage of crude protein as the period of closing is reduced. At the same time there is a reduction in the crude fibre content from 31.9 to 22.4. Hay from plots closed on 3/9/60 and 1/10/60 would be much more valuable for summer and autumn feed than hay from plots closed earlier.

Yield:

The yield of hay is also of considerable interest. No advantage in weight cut was

obtained from closing in May or the end of June, and closing at the beginning of August resulted in the highest yield of 2.9 tons an acre. It must be remembered that the season ended much sooner than usual in 1960 and that in many years, hay cutting at Denmark can occur from late November to late December so that closing up at the beginning of August could be too soon in these districts.

One result of early closing for hay was a reduction in the amount of grazing obtained from the paddock; there was an obvious loss of grazing from closing earlier than August 1. In these trials, the grazing obtained between August 1 and September 3 could easily have accounted for most of the difference in yield between treatments C and D, and the better quality of hay from D would have more than justified the lower yield of hay.

Botanical Changes:

The influence of early closing on the botanical composition of the pasture was of major importance, as shown in Table 2. This composition was judged visually.

TABLE 2.—BOTANICAL COMPOSITION

Treatment	Composition at Hay Stage		Stage of development at Cutting
	Clover %	Grass %	
A. Closed 16/5/60	10	90	Early seeding
B. " 28/6/60	20	80	Late flowering
C. " 1/8/60	30	70	Full bloom
D. " 3/9/60	40	60	Very early flowering
E. " 1/10/60	50	50	Late stooling

Plots from which stock were excluded early in the autumn deteriorated badly. Grasses became dominant and tended to exclude clovers, and inferior species such as Yorkshire fog and silver grass appeared.

On the plots which had been closed later in the season, the grass-clover balance was maintained and the more valuable grasses such as perennial ryegrass developed as the most important species.

Rust Infection in Clover:

Early closing encouraged rust infection on subterranean clover. A rating of the percentage of leaves showing rust infection at hay time is given in Table 3.

TABLE 3.—RUST INFECTION ON SUBTERRANEAN CLOVER

Treatment.	Percentage Infection.
A. Closed 16/5/60	25
B. Closed 28/6/60	20
C. Closed 1/8/60	10
D. Closed 3/9/60	Nil
E. Closed 1/10/60	Nil

Amount of Grazing:

During the spring, pastures provide adequate grazing but it is in short supply from April to September. Early closing for hay has the serious disadvantage of restricting the amount of grazing during late winter and early spring months. In this demonstration, pastures were grazed each time they produced sufficient feed to warrant it, usually when they reached a height of four or five inches. The number of grazings obtained is shown in Table 4.

Much more grazing was obtained from the late closed paddocks, and in spite of the very dry spring satisfactory hay cuts were obtained from closing at the beginning of September.

TABLE 4.—INFLUENCE OF TIME OF CLOSING ON GRAZING PERFORMANCE

Treatment	No. of Grazings	Subsequent Hay Yield
		tons
A. Closed 16/5/60	2	1.9
B. " 28/6/60	3	2.1
C. " 1/8/60	4	2.9
D. " 3/9/60	5	1.7
E. " 1/10/60	6	0.9

EXPERIMENT 2

W. Middleton, Denmark.

A second demonstration was carried out on W. Middleton's property at Denmark. Three times of closing were used:—May 25, July 2 and August 15.

TABLE 5.—YIELD AND CHEMICAL ANALYSIS

Treatment	Yield of Hay	Analysis		
		Crude Protein	Crude Fibre	Nitrogen free Extract
	tons/ac.			
A. Closed 25/5/60	2.2	6.8	30.3	55.1
B. " 2/7/60	2.1	13.7	27.1	49.9
C. " 15/8/60	2.5	17.2	25.7	47.7

The result in this case was similar to that in the previous demonstration. Earlier closing did not result in any greater weight of hay but there was a great improvement in the protein content of the hay if closing of the paddock was delayed until August 15.

The yield of protein an acre was greatest from the area last closed, as is shown by Table 6.

TABLE 6.—YIELD OF PROTEIN

Treatment	Hay Yield	Crude Protein in Dry Matter	Crude Protein
	tons/ac.	%	*lb./ac.
A. Closed 25/5/60	2.2	6.8	284
B. " 2/7/60	2.1	13.7	547
C. " 15/8/60	2.5	17.2	819

* Assuming 15 per cent. moisture in the hay.

Botanical Changes:

The pasture originally consisted of a good stand of Yarloop and midseason subterranean clover with some Yorkshire fog and annual grasses.

At hay cutting time, the pasture consisted of:—

Treatment A, closed 25/5/60: Grass dominant, with high proportion of Yorkshire fog and silver grass; less than 20 per cent. subterranean clover.

Treatment B, closed 2/7/60: Similar to treatment A, containing less than 20 per cent. clover.

Treatment C, closed 15/8/60: 60 per cent. subterranean clover, 40 per cent. grass.

Early closing resulted in a dominance of inferior grasses and a reduction in sub-clover content, while late closing gave a much better grass-clover mixture.

Subterranean Clover Rust:

Rust infection of both Yarloop and mid-season sub-clover occurred at the beginning of the season, but the pasture grew away from the rust during the winter and there was no recurrence until late spring. At that time, less than 10 per cent. of leaves of midseason clover on treatments A and B showed rust infection, and there was no infection on treatment C.

Yarloop clover was not affected by rust in the spring of 1960.

COMMENTS

The decision of when to remove the stock from a hay paddock before cutting for hay will vary from district to district and from paddock to paddock, but it is obvious that even in one district and on similar paddocks there is a wide divergence of opinion among farmers as to when to close.

In general, most farmers err on the early side and most paddocks are closed too soon.

One aspect which has encouraged this approach is a tendency of the farmers to graze the pasture too severely before closing up, on the assumption that one must get as much grazing as possible before closing. There is ample evidence to show that this practice retards recovery after grazing and may easily delay growth for two or three weeks.

The demonstrations detailed above in the Denmark area were carried out during a very dry spring. In a normal year, September or even October may be the best time to close some paddocks, particularly those in low lying or moist situations.

The fall in protein content with increasing age of the pasture, and the increase in fibre content as the pasture grows taller are to be expected. The canopy of green leaves tends to remain constant and the proportion of stem to leaf to increase.

A hay cut at Denmark Research Station was separated into leaf and stem and these were analysed separately. The results give some indication of the importance of having a high proportion of leaf in the hay. Protein and fibre are given as percentage of total dryweight.

	Protein.	Fibre.
	%	%
Leaves	24.5	15.0
Stems	14.3	33.7

It is obvious that high quality hay is not obtained from pasture growing over a long period, and more satisfactory hay material of higher nutritive value could be obtained from pasture closed later in the season.

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FRUIT FLY CONTROL



By D. G. SHEDLEY, B.Sc. (Agric.), Entomologist

THE MEDITERRANEAN FRUIT FLY (*Ceratitidis capitata* Wied) is one of the most serious horticultural pests in Western Australia. For more than 50 years growers of stone fruit and pears have not been able to relax their activities against this pest. Despite all their action however, there have been many occasions when fruit losses have been very severe.

New control methods for fruit fly in orchards and backyards have consistently given more satisfactory and reliable control than was possible a few years ago.

The use of malathion-protein baits was the first main step forward. Application of this type of foliage bait has now become standard practice in many orchards.

The most recent advance in fruit fly control has resulted from the production of chemicals which, while remaining toxic to adult flies resting on sprayed fruit and foliage, also have the ability to penetrate fruit and kill eggs and larvae within the fruit. Dipterex was the first of this type of insecticide to be tested locally and has proved useful in protecting ripening stone fruit for from seven to 10 days after application.

Rogor and Lebaycid are more recently developed chemicals, both possessing longer residual action than Dipterex. This makes them more useful, particularly for later stone fruit and pears which normally need a longer period of protection than early stone fruit. Unlike Dipterex, they are also effective against fruit fly infestation in citrus.

EXPERIMENTAL WORK

Trials have been conducted to test the value of these new materials under West Australian conditions and to determine the most satisfactory methods of application, timing, and concentration of sprays.

During the trials, observations were also made to ascertain any harmful effects, and it was found that Rogor caused some leaf damage, while Lebaycid was highly toxic to birds.

Detailed recommendations for the use of Lebaycid, Rogor and Dipterex based on the results of these trials, are given in the accompanying table.

GENERAL INSTRUCTIONS

Detailed observations have shown that it is important to apply Rogor, Lebaycid and Dipterex as *thorough* cover sprays. Inefficient spraying may result in inadequate control.

A single spray of Rogor or Lebaycid can be expected to last from two to three weeks, and two sprays up to five weeks, after the first application. Where crops such as oranges are allowed to hang after ripening, repeated sprays may be needed during periods of susceptibility.

FRUIT FLY COVER SPRAYS

FRUIT	INSECTICIDE	CONCENTRATION	APPLICATION
APRICOTS AND EARLY PEACHES	LEBAYCID	1 oz. in 8 gallons	Single spray 7 to 10 days before the first pick, or, for longer protection, two sprays as for other stone fruit.
	DIPTEREX	1 oz. in 6 gallons	Spray weekly from the first sign of fly strike.
OTHER STONE FRUIT	LEBAYCID	1 oz. in 8 gallons	{ Two sprays 7 to 14 days apart, timed so that the second spray is applied one week before the first pick.
	ROGOR	1 oz. in 6½ gallons	
	DIPTEREX	1 oz. in 6 gallons	
PEARS AND CITRUS	ROGOR	1 oz. in 6½ gallons	{ Two sprays 7 to 14 days apart, timed so that the second spray is applied one week before the first pick.
	LEBAYCID	1 oz. in 8 gallons	
	LEBAYCID	1 oz. in 4 gallons	

This concentration may be used where longer lasting effect is desired.

WARNING.

Where there is danger of poultry or other birds contacting this spray or freshly sprayed trees, LEBAYCID should not be used.

ROGOR and LEBAYCID should not be used within one week, and DIPTEREX within three days of picking. ROGOR has been observed to cause leaf fall of apricots and early peaches, and scorching of fig and loquat fruits and leaves.

Dipterex cannot be relied on to last more than seven or eight days, and is ineffective on citrus. The addition of a wetting agent is an advantage with Dipterex, particularly for spraying plums.

ROUTINE CONTROL MEASURES

It is suggested that cover sprays may be used to supplement the routine baiting practices, for which the following mixtures are recommended:—

Malathion—1 oz.

Protein— $\frac{1}{2}$ to 1 oz.

Water—1 gallon.

or

Malathion—1 oz.

Sugar— $\frac{1}{2}$ lb.

Water—1 gallon.

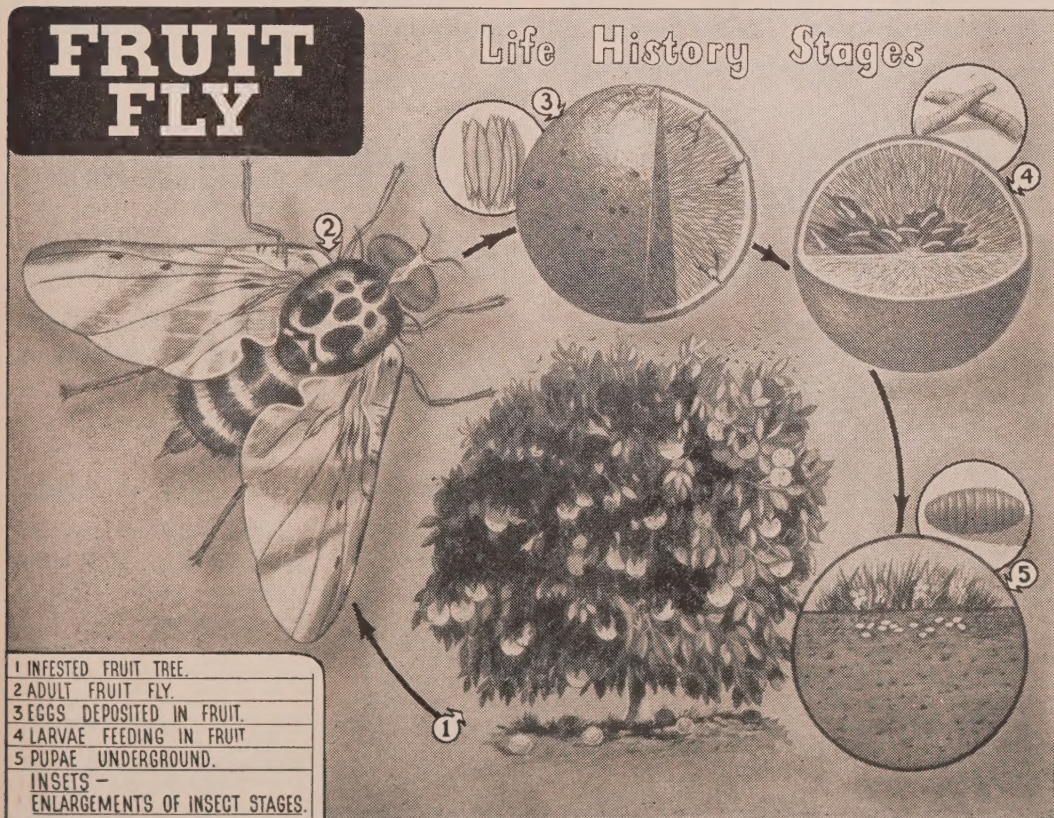
One gallon is enough for 30 to 40 trees and should be splashed onto the trees at weekly intervals, from six weeks before the fruit is ripe and continuing until two

weeks after all fruit is picked. Sodium fluosilicate ($\frac{1}{4}$ oz.) plus sugar (10 oz.) in one gallon of water may be substituted for the malathion bait.

When not actually egg laying, fruit flies spend much of their time in citrus trees, from which they can obtain their food requirements. Therefore, periodic baiting of these trees, even when no ripe fruit is present, helps prevent attacks on other fruit and should be carried out throughout the year.

Trees or varieties which are known to be regularly infested should be treated with Rogor, Lebaycid or Dipterex according to the chart.

THE CONTROL MEASURES HERE OUTLINED HAVE BEEN FOUND TO BE VERY EFFECTIVE, BUT NOTHING HAS YET BEEN DISCOVERED WHICH DOES AWAY WITH THE NEED FOR CONSCIENTIOUS ORCHARD HYGIENE, INCLUDING THE PROPER DISPOSAL OF INFESTED FRUIT.



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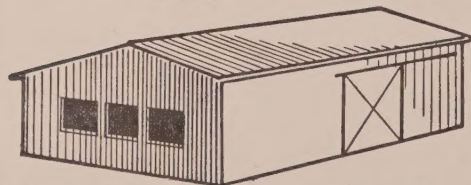
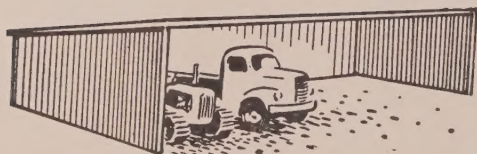
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NATIONAL PARKS

of Western Australia

By C. F. H. JENKINS, M.A., Government Entomologist*

"NATIONAL PARKS," says the Encyclopaedia Britannica, "are spacious land areas, essentially of primitive or wilderness character, that contain scenery and natural wonder so outstanding in quality that their preservation intact for the benefit, enjoyment and inspiration of the people, is a national concern."

Although all the so called national parks do not comply with the above conditions, there are few people who will argue with the terms of the definition, or the desirability of striving to fulfil them.

The necessity for reserving large areas of land as national parks and nature reserves has long been recognised in many parts of the world, and some enormous tracts of country have been set aside for these purposes.

Amongst the best known of such reserves are the Yellowstone National Park in the United States of America, and the Kruger and Serengeti National Parks in Africa, but many of the lesser known areas are serving equally important functions.

* Member, National Parks Board.

Preserving the National Heritage

National park and kindred authorities in all parts of the world (such as the "Nature Conservancy" of Great Britain, U.S. National Parks Service and the U.S. National Wild Life Federation) are faced with the ever-increasing problem of maintaining national parks and nature reserves in view of the rate of population growth, the expansion of agriculture, improved transport facilities and the consequent pressure for increased land use. They draw attention to the need to act quickly where suitable areas for reservation still exist, and the importance of resisting claims for the over development or "improvement" of certain areas.

"It is necessary," says the Annual Report of the Nature Conservancy of Great

An unusual picture of a black swan (centre) on her nest in a sheltered section of the John Forrest National Park. Overdevelopment of national parks may drive away rare birds or animals, says a British report



Britain (1959), "to reconcile the use by the present generation of the national heritage with the need to safeguard its irreplaceable features for future generations . . . Use alone may be sufficient to threaten the scientific interest—to trample out of existence a rare plant, to drive away a rare bird or other animal, or destroy the character of a unique habitat."

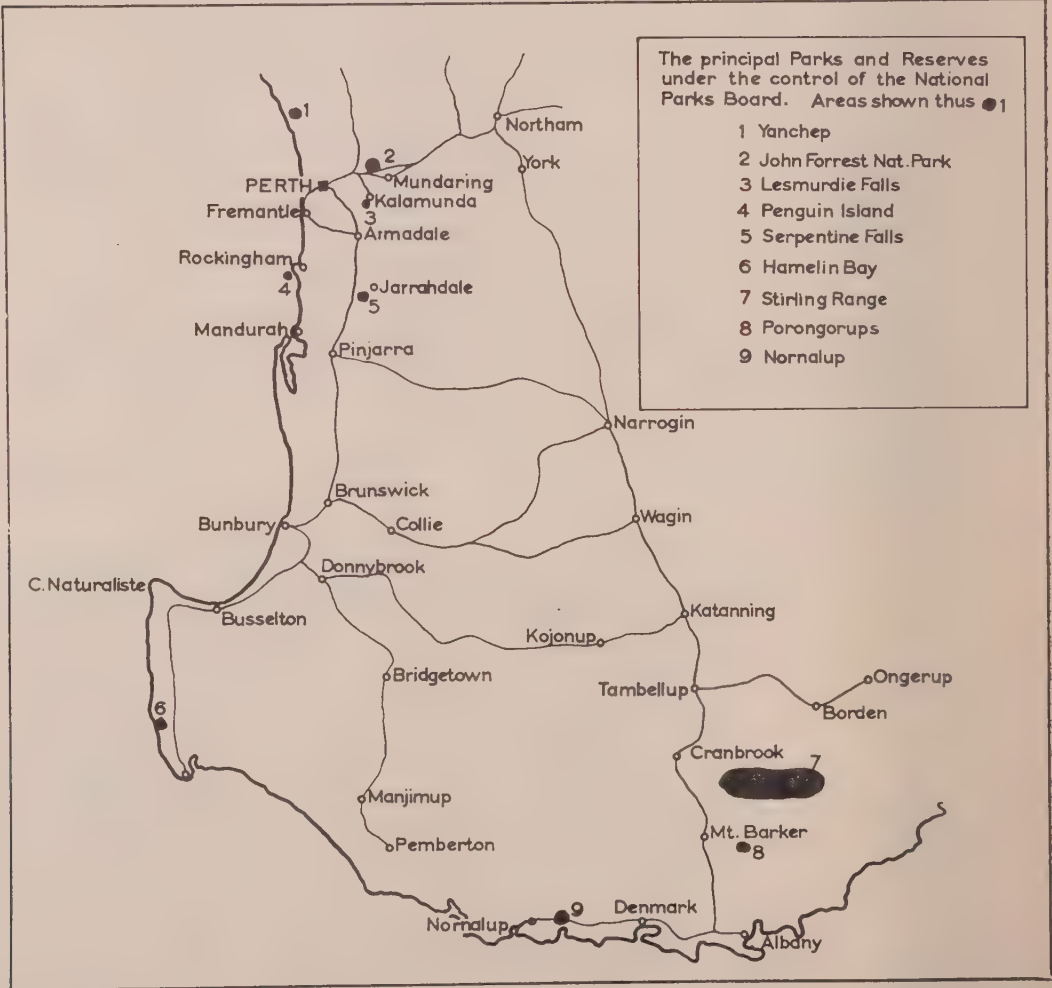
The same report states—"National bodies are being compelled to admit that their earlier policy of encouraging public access to building sites can turn out to be a Frankenstein Monster."

Bearing all these difficulties in mind "The National Parks and Access to the

Countryside Act, 1949" of Great Britain has set down a policy for its National Parks Board which could well serve as a guide for other authorities: "To so administer the lands under its control as to ensure the preservation of their natural beauty, the conservation of native flora and fauna and the protection of geological and physiographical and other features of special interest."

Danger of Over-development

Referring to the Australian scene, the Australian Academy of Science has recently been forthright in its criticism of engineering development proposed for the



Major parks under the control of the National Parks Board

View from the Porongorups towards the Stirling Ranges. The country between these two reserves was once renowned for its flora. Much of it has now come under the plough



summit of Mount Kosciusko and utters the following warning about the tendency to over-develop many parks and reserves (Anon 1961):

"But any national park, in addition to catering for the tourist and certain types of recreational sport, must also comprise areas in which conservation is the prime object. This is particularly important in Australia, a continent whose endemic flora and fauna attract world-wide attention. All local and visiting biologists are impressed by the fact that, after only a short period of settlement, very few virgin areas of native vegetation survive in Australia. Native plants, birds and animals are rapidly disappearing from the scene, even in districts in which there is no settlement as yet. A number of primitive areas will be essential if we wish to preserve for posterity characteristic examples of the Australian biota still existing in their natural environment, so that they can be studied by the scientist, and at the same time, provide a living museum for the naturalist and layman. Such primitive areas must be large enough to ensure that hydrological features, soil, and local climate are undisturbed by man's activities; large enough also to ensure that the ecological balance of the plant and animal communities is maintained. It follows that grazing, forestry, roadmaking and all engineering activities are out of place in a primitive area."

The Western Australian reserves fall into the following categories: A class reserves under the control of the National Parks Board (commonly known as National Parks) and A, B and C class reserves vested in various other bodies. It is only the "national parks" which will be dealt with in this series of articles, which are designed to give some general information about the location of such parks and their principal features.

The major national parks in Western Australia, in order of size, are as follows:—

- (1) The Stirling Ranges (269,155 acres).
- (2) Nornalup National Park (32,943 acres).
- (3) Yanchep Park (6,660 acres).
- (4) The Porongorups (5,384 acres).
- (5) John Forrest National Park—Greenmount (3,648 acres).
- (6) The Serpentine Falls (1,440 acres).

Small reservations of under 1,000 acres are also held at Greenmount, The Knoll—Gooseberry Hill, Lesmurdie Falls, Hamelin Bay, Yanchep Beach, Penguin Island and Araluen.

The area devoted to agriculture in South Western Australia is approximately 24 million acres, and about half of this has been developed during the past 20 years. It is obvious therefore that without a very progressive policy on national parks and

wild life reserves many natural features as well as animals and birds and plants will soon be lost for ever.

In addition to the 320,000 acres of national parks there are of course many thousands of acres of special fauna and flora reserves, State forests and water catchment areas. These offer valuable protection to many forms of wild life and compensate in some degree for the rather meagre acreage covered by the true national parks.

It must be conceded that wild life conservation depends to a great extent upon the acreage of parks and reserves which are set aside for this special purpose, and that such areas should be rigorously protected from any attempts at encroachment, including the depredations of grazing stock. However, the passing of conservation laws and the gazettal of reserves are not sufficient in themselves to protect anything, and unless parks can be patrolled and regulations can be enforced the most enlightened legislation can be nullified.

For instance, as a result of the recent unrest in Africa some of the most famous game reserves have been ruthlessly violated by trappers and poachers with

disasterous results to many rare and unique forms of wild life. It is clear therefore, that one of the most important factors in flora and fauna conservation is a sympathetic public.

Great emphasis is now being placed upon the tourist potential of Western Australia and amongst the chief attractions listed are the natural scenery and unusual plants and animals. As already mentioned "Use alone may be sufficient to . . . trample out of existence a rare plant, to drive away a rare bird . . . or destroy the character of a unique habitat."

Every citizen therefore should be a self-appointed guardian of our much boasted natural assets and not only refrain from destroying plants and animals in declared parks and sanctuaries, but protect them wherever possible in all parts of the State.

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SELECTING A HERD SIRE



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By R. BETTENAY, Dairying Division Adviser

THERE is now ample evidence that most of the differences in production between herds are determined by feeding and management, with differences in genetic merit playing a relatively minor role.

It seems that the quickest way to increase production is by improved feeding, whilst in some herds much production is being lost by faulty milking techniques.

This should not be taken to mean that improving the breeding—and so the upper limit of production—of your herd is not important, because it has been shown that the cow with the greatest potential production—that is the “best” cow—is likely to be the best cow at all levels of feeding. Any genetic improvement is permanent and can be transmitted from one generation to the next.

The farmer has two practical methods of improving the genetic merit of his herd:

- By actively culling low producers.
- By mating the remainder to a bull which is likely to throw daughters better than their dams.

How then can you select such a bull and in what herds are you likely to find him?

Should be Pure Bred

Your herd sire should be a pure bred animal of acceptable appearance and with no obvious defects. For this reason it is important to inspect the animal and any close relatives including the dam, full or half-sisters and, of course—if you are interested in an older bull—any progeny that are available.

If the dam is an aged cow, so much the better. We are interested in breeding

animals which will produce at a high level over a long life time, and a cow that has stood up to the test of time without losing her desirable dairy “type” is the kind we want.

Proven Sires

In W.A. there seems little point in recommending that you buy a proven sire, or even the son of a proven sire, as no official Sire Surveys have yet been published.

There are many difficulties in the way of proving sires where daughters are all within the one herd as it is difficult to know how much production has been influenced by conditions within the herd. This can be partly overcome by using a daughter—dam comparison method of surveying, or by comparing daughters’ productions to those of other animals of the same age in the herd, if there are any.

The daughters of bulls used at A.B. centres are spread over a great number of herds and it is acceptable, in this case, to compare bulls on the basis of the average production of a number of their daughters.

Although officially proven sires are not available you should, in selecting a bull,

go carefully through the production records of the herd and inspect half-sisters for type and production. Inspect all half-sisters, not just the best few, as a good even line is better than a few top-notchers and a lot of culls.

Relationship to Your Own Herd

It is a fairly common belief that you should buy a future sire from the same strain as your present bull, but there seems to be no scientific justification for this.

It could be justified in the case of deliberate line-breeding to keep your herd related to a particular animal of proven worth, although there is certainly no reason why you should not return to buy a second bull from a herd if you are well satisfied with the progeny of the first bull.

Other things being equal however, it seems that you are likely to obtain equally good results from a bull not related to your herd, as this can introduce a certain amount of hybrid vigour by the introduction of genes not present in the original strain.

Where to Look for a Bull

It seems obvious that you should look to the Pure Bred breeders whose herds have been under official test for a long time and who have high production records, when you wish to purchase a replacement sire.

This is certainly a good starting point and, after all, the only way you can be certain a cow can produce at a high level is to feed her well and note results. By the same token a cow which has had every opportunity and has not produced well has demonstrated that she has little genetic merit, and her son would probably not be an asset to your herd.

I have already suggested, and experiments have proved, that there are good and bad cows in every herd, and the genetic difference between the top herds and the lowest herds is not likely to be very great. If this is so then it is obvious that a bull from the best cow in any herd is likely to be a good buy if he is a pure bred.

Certainly it seems preferable to select a bull from a cow averaging 350 lb. fat in a herd averaging 250 lb. fat, rather than from a cow averaging 400 lb. fat where the herd average is 450 lb.

Butterfat Test Important

Finally, it is known that butterfat test is more highly inherited than total milk production. This means that a bull from a high testing strain can be expected to pass on a greater proportion of the difference to your herd than a bull from a herd giving more milk but with no higher test than your own.

DAIRY SIRE SURVEYS

While no official sire surveys have been published in Western Australia, a number are now in progress. These are associated mainly with the Artificial Breeding Centres.

To measure effectiveness in increasing production and as a means to "proving" the Artificial Breeding sires it is essential that as many heifer calves bred in the scheme as possible be marked. All A.B. members are therefore asked to co-operate by having their calves marked. In other cases in the grade and pure bred herd recording schemes the only calves marked are those sired by bulls for which the owners make application for a survey.

The herd recorders are required to mark calves in herds under test, while the A.B. Field Operators mark others.

The code used allows identification of the individual by a letter sequence in the right ear and as the daughter of a particular sire by a letter code in the left ear. The season of birth is also determined from a further letter code in the left ear.

On marking each calf the officer hands the owner a certificate showing the code and the name of the sire, and a duplicate is forwarded to the A.B. centre and filed for future reference, while a triplicate remains in the book as a further check reference if required.

As marked calves come into production their yields can be related to their sires, and the comparative value of these can then be assessed.

WANTED: A NEW APPROACH TO RABBIT CONTROL

By A. R. TOMLINSON, Chief Vermin Control Officer

THE main reason why rabbits have not increased as rapidly as their amazing capabilities might have led people to expect has been a series of years not suitable for full breeding. This has been more important than myxomatosis and "1080". This was one of the thoughts taken away by those who attended the rabbit control symposium held in Perth recently.

A study of biological and meteorological information by scientists had revealed this rather sobering fact, together with a further fact that had there been a series of favourable seasons—as has happened often enough in the past—it is probable that Australia's existing control organisations could not have held the rabbits in check.

The symposium was a most interesting experience for those who attended. All had some interest in rabbit control, and there was a unique opportunity of learning the latest scientific advances in biological and technical knowledge of rabbits or their control directly from some of the scientists involved.

The Eastern States C.S.I.R.O. and W.A. Agriculture Protection Board research scientists gave all this technical detail clearly and simply in the papers they presented, and in the innumerable questions they answered or discussions they freely joined. There could be little doubt that much of the information given answered questions which had been unanswered, and exploded myths which have been deluding people for many years.

Another thought taken away by all who listened must have been that the new scientific information destroys the foundations of many of the generally accepted control theories, so much so that immediate

changes in techniques, organisation and policies are necessary.

Even present legislation is based on the earlier ignorance of the way rabbits live. Western Australia is probably well ahead of other States in the new steps it has taken or is taking, but this is still a long way from the complete application of the latest techniques and knowledge of control and the latest information available on the biology of rabbits.

The papers presented at the symposium, were: "Rabbit Biology and Behaviour and their Bearing on Control" by Mr. K. Myers, Principal Research Officer, C.S.I.R.O.

"One Shot Baiting" by Mr. C. D. Gooding, Officer in Charge of Vermin Control Research Section, A.P.B., W.A.

"Rabbit Control—Prospects for the Future" by Mr. B. V. Fennessy, Principal Research Officer, C.S.I.R.O.

"Rabbit Control in W.A." by Mr. C. Marshall, Field Superintendent, A.P.B., W.A.

Reproduction in Rabbits

The scientists made it very clear that, although the present rabbit position is one of low level populations, this is not due to the help given to control operations by myxomatosis—which is the popular theory. As Mr. Fennessy explained, it is due to the

lack of suitable seasons to allow rabbits to reproduce normally.

Despite the effects of myxomatosis in 1952 and annual outbreaks ever since, close studies show that rabbits in the Eastern States have been increasing steadily over the last three years. Western Australia is three or four years later in the myxomatosis cycle, but there is no doubt the same pattern is being followed here.

The present public complacency, because rabbits are still relatively few, is based solely on a misunderstanding of a situation which could change quickly and radically in one season.

Mr. Myers has found that rabbits can increase ten-fold in a favourable season. When rabbit numbers are high the reproduction rate falls, but when they are low as at present, it is greatly accelerated. However if they become very few their social system is liable to be so disrupted that reproduction is further depressed.

A dry winter or spring is unsuitable for rapid breeding, but on the other hand, over-wet seasons are just as unfavourable.

If they have a satisfactory season the does can have up to seven litters each, at

monthly intervals, with a total of up to 35 young in the season. Their daughters in the early litters can be breeding themselves before the season is finished. Fortunately all the litters do not survive, but even if the survival is low there can still be a lot more rabbits than at the start of the season.

Obviously, unless the percentage of rabbits killed is very high control work is purely a waste of time and money.

The Rabbit Society

Mr. Myers has discovered that a complex social system of home ranges has the effect of confining rabbits in small groups, each with a strict order of seniority, to small areas where they live, breed and feed. The system is rigidly applied during breeding but breaks down with exploratory journeys for food and water in summer.

The existence of this home range social structure means that poison trails on a property will miss many of the rabbits unless they cut through every home range.

Pressure of over population forces sub-adults out of their social groups in late spring, and breeding competition forces out another lot in autumn. These lead to



When rabbit numbers are greatly reduced, the survivors retreat to sheltered places, such as this rough, bracken-infested country near Manjimup. From these "infestation foci" they later spread out to re-infest the neighbourhood.

the well known seasonal movements which are often ascribed to invasions from neighbouring properties or Crown Lands, and not to the correct source: too many rabbits left after the completion of destruction work.

Sources of Infestation

Mr. Myers' work has also revealed that once rabbit numbers are greatly reduced the survivors are found only in specially favoured or sheltered places. From these "infestation foci" they spread out and re-infest the neighbourhood or district. They were actually doing the same when numbers were high but this was not so obvious.

Had it been possible to concentrate a community control effort on these places instead of spreading it evenly over the area generally rabbits may have been eradicated from many of the individual holdings.

The present system of individual land holder responsibility is in fact in direct opposition to the true biological requirement of community concentration on the infestation foci. This would cut out most of the control work on surrounding areas and properties.



Dropping "1080" poisoned oats into a trail

Objective Needed

Mr. Fennessy considered that one of the main reasons for past failures has been the lack of an objective. People have been content to kill some rabbits without caring how many are left. Usually reliance is placed on the currently popular "answer to the rabbit problem"—such as myxomatosis or "1080"—without thought of its co-ordinated application with other methods.

Many farmers who have regarded rabbit destruction as merely the haphazard placing of a trail, a partial free feeding and poisoning or an unfinished ripping or fumigation of warrens, may have been surprised to learn that control works is a precision operation which if not applied exactly in accordance with definite rules might just as well not be attempted at all.

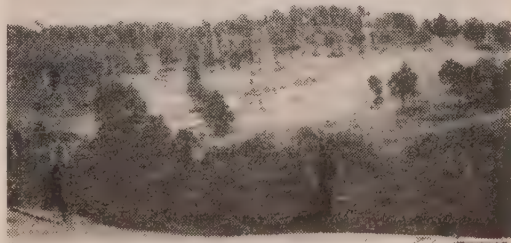
"One Shot" Baiting

The Officer in Charge of Western Australia's vermin control research section (Mr. Gooding) gave details of an important advance in poisoning developed by his section. By the application of a mathematical formula he has compressed the normal three free feeds and one poisoning into a single operation.

An involved vacuum impregnation process draws enough "1080" into a single oat grain to kill several rabbits. When grains impregnated by this process are mixed and laid out with scientifically calculated quantities of unpoisoned oats, the free feeding and poisoning operations are, in effect, combined.

Although more work on quantities and proportions is still required, results already being obtained are much better than those under the conventional system of farmers' free feeding followed by poisoning by an Agriculture Protection Board Unit.

The application of this new method by full time trained inspector-operators who will not only inspect properties but do all the actual work will greatly improve poisoning while reducing time, labour and costs.



Part of the Bridgetown area. "Killer" trials were successful here

Local Plans

West Australian plans for rabbit control in the immediate future, as outlined by Mr. Marshall, include the use of differing approaches on a zonal basis.

The higher rainfall zone will have a priority on extensive poisoning with the aid of other methods. The medium rainfall zone will have poisoning balanced with more warren destruction, while the lighter rainfall zone will have a concentration on warren destruction aided by poisoning and other methods. Inspector-operators will be introduced for poisoning wherever possible.

There can be only one ultimate objective in rabbit control, and that is eradication on properties wherever possible and confinement of rabbits to the infestation foci in other places.

There will never be a better time than now to achieve this objective. Rabbit numbers are low and myxomatosis is still able to assist; the new scientific knowledge of rabbits themselves and the new techniques of destruction give us new weapons.

The use of inspector-operators in a "killer" scheme will also be necessary. The objective will not be attained in any other way.

—from an ABC Rural Radio Talk.

4,500 Guinea Ram "A Good Investment"



"Was he worth it?" was the question asked by journalists during a critical inspection of this 4,500-guinea ram on Mr. K. Allen's Glen Lee stud, Bruce Rock. Mr. Allen (holding the ram) was convinced that he had made a good investment. The picture was taken during a tour arranged by the Royal Agricultural Society, and sponsored by the Shell Company, to view preparations for the 1961 Royal Show.

A CRUSH FOR TUBERCULIN TESTING OF CATTLE

By A. L. RIPPER, Stock Inspector

ALWAYS a useful asset on any farm where livestock are kept, a strongly-constructed crush is essential where tuberculin testing makes it necessary to deal with dry stock, bulls and young animals that have not been previously handled. The crush described in this article was specially designed for tuberculin testing, but will serve equally well for vaccinating, branding, de-horning or any operation where restraint is necessary.

This design, reprinted from an earlier issue of the Journal of Agriculture, could be useful for many butterfat farmers whose herds are now being tuberculin tested for the first time. The crush can be easily constructed on the farm.

The main features of the crush are:—

- (1) An end bail (E) in which the head of the beast is held firmly while the test is being applied.
- (2) An exit gate (D) through which the animal passes out of the crush after release from the bail.
- (3) A block-gate (B) which swings inwards, completely blocking the race against the oncoming cattle to allow sufficient space for the operator to enter the crush at the rear of the beast held in the bail, in order to make an injection of tuberculin into one of the skin folds at the base of the tail.

When the block gate is swung across the race, there should be a distance of not less than 8 ft. between it and the bail. This will provide sufficient length to accommodate the largest beast, and leave adequate space behind the animal to enable the operator to carry out the test.

The structure need not be elaborate, but must be strongly constructed. Uprights should be of heavy timber sunk deeply into the ground and the rails should be strong enough to hold even a struggling animal safely.

No details of timber sizes, hinges, catches or bail design have been included since it

is expected that most farmers will have their own preferences and will make use of material already available on the property. Where sawn timber is not available, bush timber may be used.

The width of the crush and race is important; they should not be wider than 2 ft. 3 in. This measurement is sufficient to allow large dairy cows to pass through, but will prevent small stock from turning in the race when they are not tightly crushed. The 2 ft. 3 in. is the inside measurement, all rails being recessed into the inner portions of the uprights so that there are no projecting corners or protruding bolts which could injure the cattle.

The exit gate (D) can be from three to five feet wide according to preference and the material on hand. Its width will influence the width of the panel (C) which is designed to give the added length between the bail (E) and the block gate (B). Together they should give about 8 ft. of standing room for the beast in the bail.

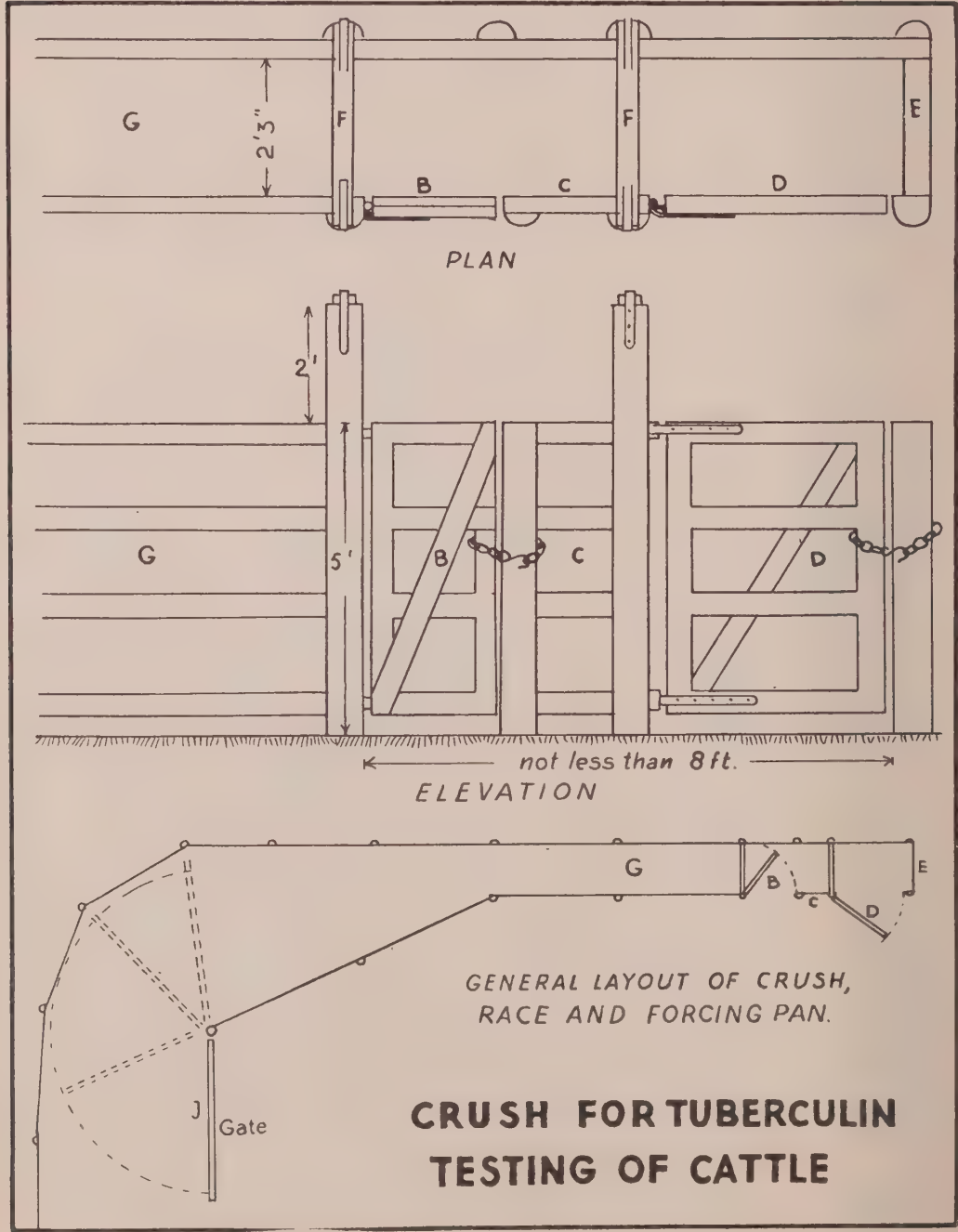
The end bail which actually holds the animal may be constructed to the owner's own design, but should preferably be a self-locking bail that is readily adjustable to animals of different sizes.

The gate-posts should be reinforced by tie-beams across the top (F) in order to prevent the gate from sagging and to guard against the race spreading under pressure from the stock.

The race (G) should be 5 ft. high with 9 in. between the rails. The length of the race will vary with individual requirements but a length of about 20 ft. should be

suitable for the average dairy herd. Do not make the inside width greater than 2 ft. 3 in., and make certain that there are

no projecting bolts or rail corners. The diagram of the general layout suggested shows a forcing-pen for filling the race.



**CRUSH FOR TUBERCULIN
TESTING OF CATTLE**

2. *The Ice Age*

What did the giant Australian marsupials of the "Ice Age" look like? Fossil remains found by farmers could help reconstruct them, as well as giving some idea of conditions on the Australian continent at that time, says D. Merrilees, B.Sc., acting Curator of Palaeontology at the West Australian Museum.

A PREVIOUS article entitled "Fossils and Farmers" was in effect a plea to farmers to search for the remains of Ice Age or Pleistocene marsupials. The purpose of the present article is to convey a thumbnail sketch of Australia in Pleistocene time in order to suggest why and where such marsupial fossils may be found.

One must not imagine the "Ice Age" as a great mass of ice covering practically the whole land surface.

In northern Eurasia and the northern part of North America, ice sheets and permanently frozen ground seem to have been more extensive, and the Antarctic ice cap may have been thicker and more extensive than it is now.

In high mountains throughout the world, the snow line was much lower, valley glaciers were much bigger and survived lower down their valleys than the equivalent glaciers do now, and some may have joined up to form relatively small ice caps.

But there was plenty of room left for plants and animals to flourish, and one of the perennially interesting and controversial facets of Ice Age history is that this was the time when man appears to have become man in the sense of developing full humanity from some previous sub-human condition. This did not happen on top of a sheet of ice!

Neither must one imagine the "Ice Age" as a single episode. There seem to have been several major and many minor fluctuations in climate.

On several occasions there was a great deal more ice on land than there is now, with climate generally colder and probably much wetter than now. On several other occasions, there may have been very much

less ice than now, with warmer conditions prevailing. Ice leaves its mark so plainly upon the land it occupies that there is little doubt of the truth of these rather generalised claims.



Figure 1.—Portions of right hand sides of lower jaws of an extinct kangaroo from Balladonia (left) and of the largest modern kangaroo in the museum collection (right). Note similarity in form of molar teeth, very characteristic of the kangaroos



Figure 2.—Femurs (thigh-bones) of a modern echidna (top) and a giant extinct echidna from Mammoth Cave (below). Despite the size difference, the similarity in form of these bones justifies the inference that the animals must have been much alike

But there was never very much ice in Australia. Here we are concerned mainly with the indirect effects of the formation and melting of ice sheets elsewhere, not (as in England) with direct and more obvious effects.

It is generally believed that Australia was very much wetter during much of the Ice Age than it is now. Our long dry furrows in the outback were then really rivers, our salty depressions really lakes, in some cases rising to the proportions of the inland seas which some of our earlier explorers sought so earnestly.

At such times, vegetation would probably have been much thicker on the ground than at present, and animals consequently more abundant.

Unfortunately, these statements can only be considered as probabilities; there is not enough positive evidence to make them certainties. It is largely because of the climatic inferences to be drawn from fossils that we are anxious to learn of new fossil localities. Any response to the appeals we make for new information and new specimens could help answer some important questions about Australian climate in the Ice Age.

One interesting aspect of what we do know about Australian Pleistocene mammals may help to make this point; it is the "giantism" illustrated by Figs. 1 and 2. Figure 1 compares the lower jaw and

teeth of the largest modern kangaroo in the Museum collection with a lower jaw fragment (containing two molar teeth) of an extinct kangaroo from Balladonia. Figure 2 compares the thigh-bone (femur) of an average-sized modern echidna with the thigh-bone of an extinct echidna from Mammoth Cave. Notice how very much larger are the extinct forms. The Mammoth Cave echidna for certain, and the Balladonia kangaroo very likely, lived in the Ice Age; there were giants in those days.

One view relates gigantic size with lushness in vegetation and therefore with higher rainfall. On this view, the occurrence of considerable numbers of individuals or species of exceptionally large size could be used to make the inference of a higher rainfall. On the other hand, the appearance of gigantic forms in the fossil record is common in times extending far back beyond the Pleistocene, and in many different groups of animals, vertebrate and invertebrate, and not only land-dwelling but also marine. To relate giantism directly to high rainfall may be altogether too simple.

At all events, it is a reasonable inference from purely physiographical evidence that Australia received a much higher or a much more evenly distributed rainfall than now on some occasions in the past,

and it may have been even drier than now on other occasions during the Ice Age.

Then, as now, populations of animals in a time of general drying up may have been tied to exceptionally favoured localities such as the soaks at the foot of granite outcrops. This appears to have been the case at Balladonia, as noted many years ago by C. G. Gibson of the Geological Survey of Western Australia. He wrote the following paragraph in his report in 1909 on routes proposed for the transcontinental railway:

An interesting fact in connection with these granite rocks has been the discovery of diprotodon bones (*Diprotodon Australis*) buried in the sand and silt beside them. Discoveries of these bones have been made at Balladonia, at Cook's Rocks, 20 miles north and at Womberna Rocks, 12 miles south. At Balladonia, bones in a good state of preservation were discovered at depths of from four to 12 feet whilst excavating a dam beside the rocks, while at Cook's and at Womberna fragments of bones were found at from four to eight feet from the surface also whilst excavating dam sites close to the rocks. It is evident that the rocks formerly formed watering places for these animals, as they still do for the present-day fauna, and that the bones are the remains of animals that have either been bogged while at the waters or that have perished as the result of the

supply giving out after a bad season, as it still does. It is quite likely therefore that a search round any or all of these rocks would result in the further discovery of many of these remains.

Common sense and an awareness that past climatic conditions may have been very different from the present thus suggest the likely sites for Ice Age marsupial fossils.

Wherever animals may have been overwhelmed and buried—in swamps, in flooded rivers, in caves and so on—are the places to look for their fossilised remains. And it is not whole animals that will have survived, but fragments like that in Fig 1. Of these fragments, jaws containing teeth are the most informative.

For those living near the coast, it may be interesting to know of another set of facts about the Ice Age. Ice sheets formed at the expense of water in the sea, so that water was in effect transferred from sea to land, resulting in a relative fall in sea level. Conversely, melting of ice sheets would have raised the level of the sea relative to the land. The present shoreline therefore is only one of a number of shorelines in any one area, and apparently is about a middling level.

Submerged shorelines may be seen by skindivers, but emerged shorelines may be visible to all in the shape of beaches or benches or cliffs or marine fossils well above the present sea level.

Figure 3.—Reconstruction, based on bones and teeth only, of possible appearance of *Nototherium*, the extinct animal whose jawbone was illustrated in last month's issue of this journal. Drawn by the museum artist, Miss R. Hunt



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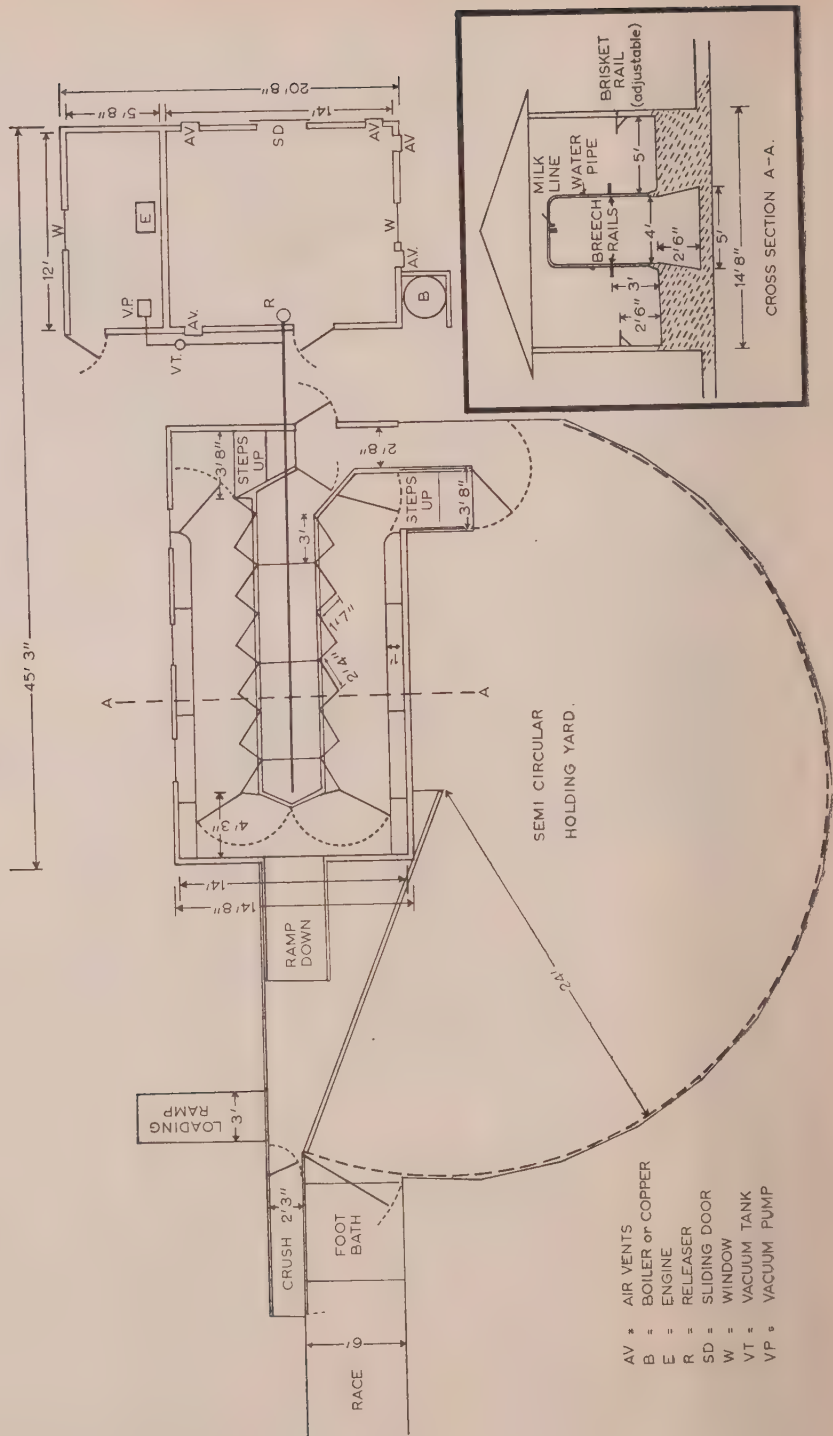
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Honey Flora Calendar For November

COMPILED BY R. S. COLEMAN, APICULTURAL SECTION, WITH ASSISTANCE FROM THE BOTANICAL BRANCH

Common Name	Botanical Name	Where Found	Honey		Quality of Pollen	Remarks
			Quality	Quantity		
Wandoo or White Gum	<i>Eucalyptus rudens</i> Schau. var. <i>glabra</i> Benth.	South of the Great Eastern Highway to Wandering	Choice	Excellent...	Poor	Late Spring or Early Summer flowering Wandoo, is budded in patches and should be regarded with suspicion as it is likely to be a dry flowering where it does flower.
Brown Mallet	<i>Eucalyptus</i> <i>astringens</i> Maiden.	Ravensthorpe, Wandering Wagin and	Good	Good	Good	Mainly found in plantations, as most of the native forests have been cut for the bark. Little or no budding for this year. The honey is very much like York Gum honey.
York Gum	<i>Eucalyptus</i> <i>torophleba</i> Benth.	Wide-spread throughout the State. It is found in a wide belt from North of Northampton to Salmon Gums	Good, Medium amber. Candles with a fine grain	Very Good	Very Poor	One of the main honey flows. Falls sometimes for unknown reasons. It is budded to flower this year.
Jarrah	<i>Eucalyptus mucronata</i> Sm.	Widespread. South of Lance- lin and Moora to the east of Albany	When pure, Jarrah honey is a good, medium amber	Good	Excellent	The coastal Jarrah is a better producer than the forest Jarrah. It is not a dependable crop, as it seems to depend upon the quantity of Spring rains.
Flooded Gum	<i>Eucalyptus rudis</i> Endl....	Wetter areas along water courses	Good	Good	Good	A good strength-building flow and if the bees are strong enough in the beginning, will give two or more extractions.
Green Paint Plant	<i>Verticordia densiflora</i> Lindl.	Sand Plain along the west coast	Extremely poor	Good	Uncertain	This plant produces unextractable honey; the combs must be melted down or washed in water. Keep away from the areas with this plant during November.
Needle-Leaved Bark	<i>Melaleuca rhaphiophylla</i> Schau.	Rivers and swamps in the South-West Division	Poor	Medium to poor	Good	Not important, except when associated with another medium producing flow such as Flooded Gum.
Paterson's Curse, Salvation Juice, Vipers Vugloss	<i>Erhium plantaginum</i> Linn.	Widespread weed	Excellent	Excellent	Excellent	Apparently needs a wet winter to produce.
Taylorina	<i>Psoralea pinnata</i> Linn.	In the swampy areas of the Albany and Denmark Districts	White, lant	Good	Good	A fine honey. It is an introduced plant.
Diamond Bush	<i>Bossia Laidlawiana</i> Tovey et Morris.	Karri forest	Good	Good	Excellent	One of the best pollen supplies in the State. This is believed to be the plant that causes the bees to swarm excessively.
Soap Bush	<i>Trymation spaldatum</i> (Labil.) Ostrf.	Karri Forest, and northwards on coastal plain	Fair. It has a marmalade taste	Good	Good	Soap bush and Wild Hop form the hazel thickets of the Karri forest.
Wild Hop	<i>Chorlaena hirsuta</i> Benth.	Karri forest	Fair	Good-Fair	Good	Bees can work it in the rain as the flowers are pendant. Associated with the Soap Bush.
Xmas Tree, or Munjil	<i>Nyctasia floribunda</i> (Labil.) R. Br.	Widespread	Medium	Good	Excellent	An excellent plant for building up hives.

BASIC PLAN OF A HERRINGBONE SHED



Let's look at . . .

HERRINGBONE DAIRIES

By R. BETTENAY, B.Sc. (Agric.), Agricultural Adviser, and
F. FIELDER, M.D.D., Dairy Instructor

THE first of the modern type herringbone dairies in Western Australia was constructed by Mr. F. Tucker of Ruabon, in 1957. Since then there has been strong interest in this system, and there are now at least six such sheds operating in the district between Ludlow and Augusta. Many more are being constructed.

Now seems to be a good time to have a critical look at this type of shed and discuss its advantages and its possible disadvantages, compared with the more conventional walk through bails.

WHAT IS A HERRINGBONE DAIRY?

The modern herringbone dairy is one constructed in such a way as to combine the advantages of "non-stoop" with fast milking by reducing the amount of walking required in the milking operations. This is done by having the milker's alley at a lower level than the cows and by bringing in the cows on either side of the milker's alley, where they are "angle parked" with their heads outwards in such a fashion that the udders are placed con-

veniently close to the alley. A single milk line runs above the centre of the alley and cups are swung across from one side to the other.

ADVANTAGES

1.—Non-Stoop

This advantage is not confined to the herringbone dairy and can be incorporated into plans of several other types of shed. It enables milking to be done much more comfortably and also enables the operator to give the udder a much closer inspection.

2.—Ease of Breaking in Heifers

Cows readily get used to herringbone sheds and are reassured by the proximity



Fig. 1.—A general view of the first herringbone dairy in the State, an eight-stand shed built by Mr. F. Tucker of Ruabon

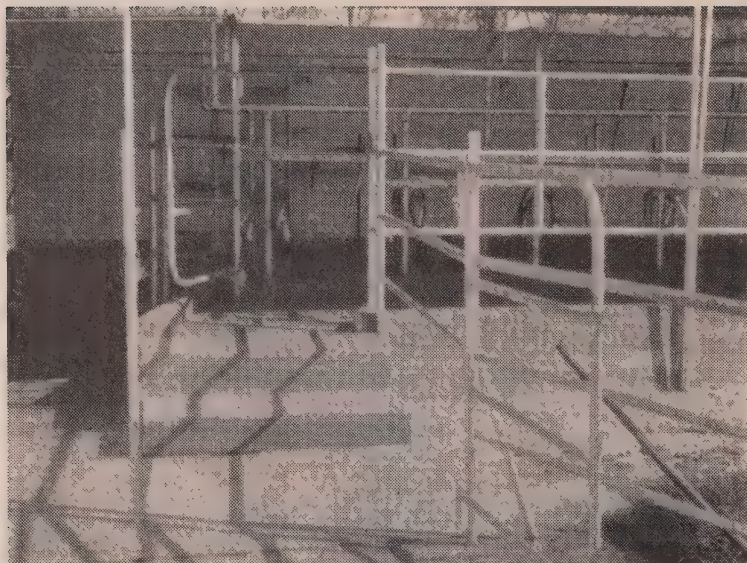


Fig. 2.—Cows readily learn to walk up steps, but should leave the shed by a ramp

of adjoining animals. In particular, heifers are much easier to break in than in the walk through shed, as they can be brought in between cows already broken in. They then stand in the correct milking position, and need little if any guidance.

3.—Speed in Milking

This is said to be the greatest advantage of the herringbone dairy. Here it must be emphasised that fast milking is only to be commended if it can be combined with complete milking. Trying to race the clock is a big mistake.

A number of studies have been made to compare the time of milking under different systems. The findings of several of these are worth quoting.

In a study in the U.S.A., the following figures were obtained:—

Type of Shed.	Cows Milked per Man Hour.
Herringbone—	
6 per side	46
5 per side	44
4 per side	40
Walk Through—	
Double 3	35
Single 3	31
Single 4	32
Single 5	32

Other combinations were all slower than the above.

In an Australian study, from 20 to 25 cows a man hour were milked in conventional walk through systems, compared with 40 to 50 in a herringbone shed with five to six units a man. This could result in a saving of up to two hours a day for a herd of 50 cows.

4.—Less Time Spent Around the Dairy

Because the cows are milked faster, they can return to the paddock earlier. This results in less fertility being deposited around the dairy as dung and urine, and also gives the herd more time for grazing.

5.—Elimination of Leg Ropes

It is possible to use leg ropes in a herringbone dairy, but in practice it is invariably found that the cows are docile and leg ropes are not warranted.

6.—Hygiene

Shed hygiene of a high standard can speedily be accomplished, as the elevated cow platforms lend themselves to better drainage.

DISADVANTAGES

1.—Cost of Construction

It is difficult to set a figure on cost of construction, but in general it is found

that the herringbone shed is more expensive to build than the walk through type.

2.—Problem of Slow Milkers

It is generally conceded that the herringbone dairy can lead to udder damage and premature drying-off unless the dairyman is efficient and is familiar with the individual cows. The main problem here is with slow milking cows; the time taken to put through a batch of cows is limited by the slowest milker.

This can be at least partly overcome by any one of three methods:—

- (a) Cull slow milkers from the herd.
- (b) Sort out slow milkers into a separate yard and milk them last in one batch.
- (c) Place an additional Rider Unit, on long flexible milk and air lines, for every three units and put the cups on slow milkers first as soon as they enter the shed and have been suitably stimulated. This increases flexibility and reduces the need to sort out slow milkers, but increases the cost of the shed and has the added disadvantage of cluttering up the milker's alley.

3.—Shed is Suitable Only for Milking Cows

The herringbone shed is suitable only for milking the cows. Its design is such that it cannot easily be used for other purposes, and consequently it is desirable to have a general purpose crush near by. This

could be an advantage rather than a disadvantage because subjecting cows to anything unusual in the milking shed interferes with the let-down mechanism, and is not recommended.

4.—Splash Danger

In the herringbone design there must always be some danger of the operator being splashed by dung or urine, but in practice this is seldom a serious problem. Some designs incorporate a dunging yard at the entrance to the shed, and this together with the fact that cows are generally content in the shed, results in little mess being produced. A slightly built-up section at the sides of the milker's alley gives some added protection.

If many cows dung or urinate in the milking shed you should look for reasons why cows are discontented. Remedying these will result in cleaner sheds and higher production.

POINTS ON CONSTRUCTION

Basic Plan

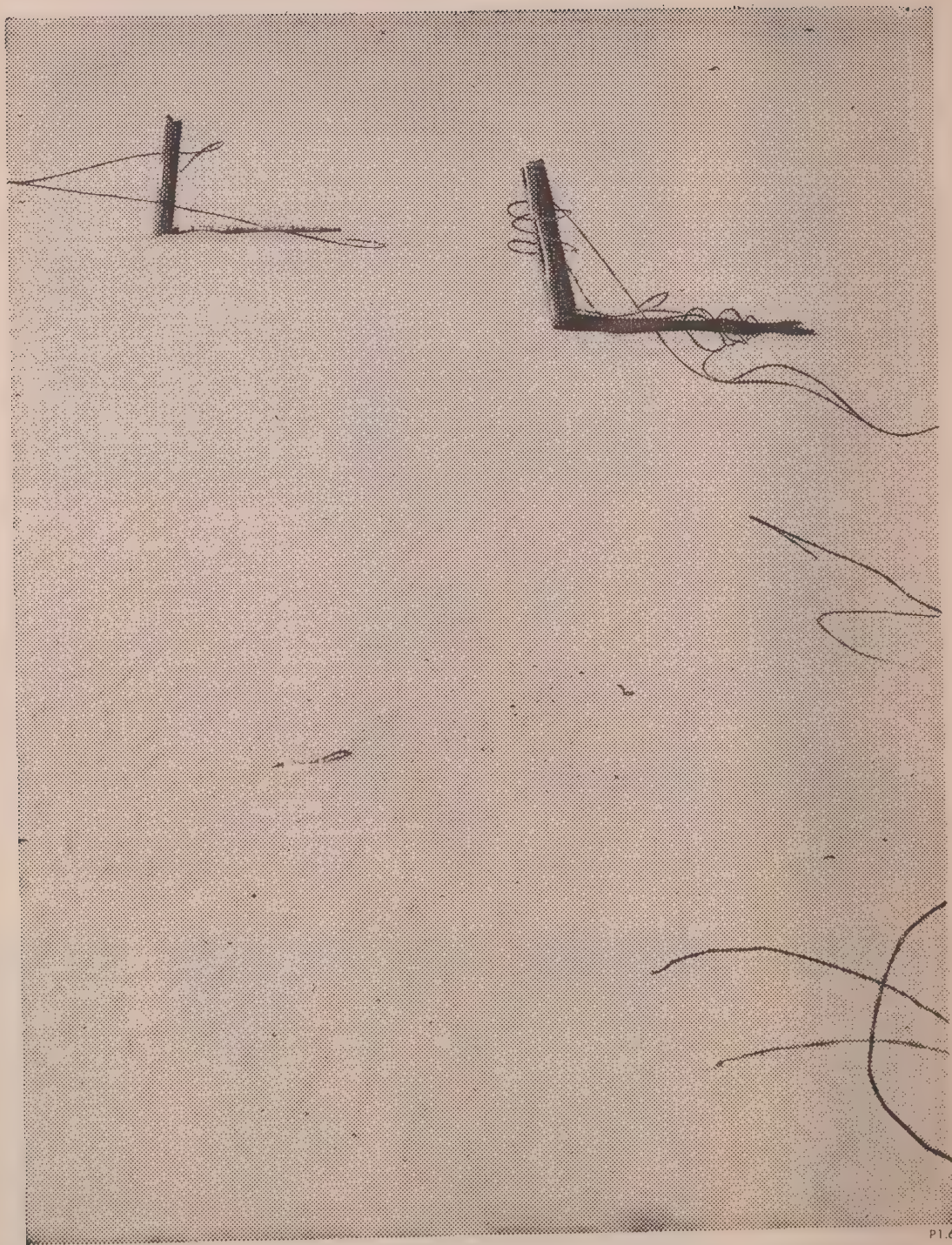
A standard type of plan, incorporating six stands, is shown in the accompanying diagrams. This can be modified in various ways to suit the particular site and the inclination of the owner but many of the dimensions shown are basic and should not be altered.

Materials Used for Construction

As in all dairy premises, the material used in construction should be one that

Fig. 3.—Mr. J. Gersbach of Metricup has built a 10-stand dairy incorporating feeding bins. This view also shows the sloping edges of the milker's alley and the built up section which helps to reduce splash





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Fig. 4.—Mr. T. Smith of Abba River has an extensive area built up at the opposite end of the milk room, and cows enter from there. The milker's alley, although 30 in. lower, is still above ground level

gives strength and permanence, combined with easy cleaning and a pleasing appearance. Wooden frames and asbestos or galvanised iron are permissible, but this ideal can be brought about most readily if the building is of brick or cement on a steel framework.

Fittings in the shed should be of tubular steel, as these, although possibly more costly to install than wooden ones, are permanent and more hygienic.

The breech rails are best constructed of 3 in. x ½ in. flat iron, which has the advantage over piping that it gives a flat surface and is less likely to disturb the cow which comes in contact with it. It also takes up less room.

All floors and drains must be cemented.

Desirable Size

It is generally considered that six stands is all that one man can handle and this is adequate for a herd of about 50 cows. If additional labour is available it would be better to build up to an eight stand shed, but there seems little need to go beyond this size unless the herd contains more than 100 cows and a least two full time operators are available.

Floor Levels and Drainage

Drainage must be away from the milk room towards the other end of the shed. In addition, both the milker's alley and the cow platforms should slope away from the centre. The minimum permissible slope is one inch in ten feet and a slightly greater fall could be an advantage.

Consideration should be given to directing drainage from sheds and yards into a sump, from which it can be pumped into a tank and returned to the paddock.

Cow Platforms

The standard height of the cow platforms above the milker's alley is 30 inches and can be achieved either by raising the platforms or lowering the alley, or a combination of both, depending upon ground levels and drainage. It is considered desirable for cows to walk up steps to the platform. Three 10-inch steps are suitable provided each is at least 24 inches wide.

An inclined ramp is better for downward traffic and should be suitably scored so as to prevent slip.

Bail Feeding

Although ball feeding facilities are not necessary they can be incorporated by installing feed bins or a long trough along the outer walls of the cow platforms. However, feeding during milking can offset advantages of this type of shed by requiring more labour and by reducing hygiene, so if it is desired to feed concentrates or licks to the cows, it may pay to construct separate feed bails.

Holding Yards

A holding yard sufficient for the entire milking herd is required at one side of the milking part of the shed, and should be entered via a laneway approaching the shed from the opposite end to the milk room. It is possible to arrange this so that

one lane is sufficient for incoming and outgoing cows, so minimising the number of yards and fences required around the shed.

As a basis of calculation it is considered that 15 square feet of space is enough for each animal provided all cows in the herd are dehorned.

This can be achieved by constructing a semi circular yard with a pivoting gate which is, in effect, a mobile fence used to reduce the size of the holding yard while increasing the size of the exit yard as the herd is being put through the milking shed. After milking, the cows can be held in the dual purpose cemented yard or can be returned direct to the race and so to the grazing paddocks.

Washing the yard can be facilitated by having as the lowest rail of the gate a pipe which can be connected to a water hose. Jets in the under side of the pipe then allow the whole yard to be wetted in one arc of the gate.

MANAGEMENT IN HERRINGBONE DAIRIES

The herringbone dairy is constructed in such a way that cows enter in batches, one side being completely filled for a start, and the cups put on after suitable washing and stimulation. The second side is then filled and cups transferred across the milking alley.

Adequate Stimulation Necessary

Investigations in recent years have shown the necessity for adequate stimulation before the application of the cups. To provide this stimulation, washing should be accompanied by a vigorous massage of the udder for about 30 seconds, followed by use of the strip cup. If this is done no further delay is necessary before putting the cups on.

The latest New Zealand recommendation is that stripping—even by machine—is not necessary, so that after a 30 second stimulation you should be able to remove the cups from the cow opposite when she has finished milking and immediately transfer them to the new cow.

Water for Udder Washing

Cold water is considered quite satisfactory for washing the udder and perhaps the best arrangement is to have water pipes running the length of the dairy at either side of the milker's alley, with downhoppers fitted with automatic shut-off ball valves. By this means running water is immediately available and its use reduces the risk of carrying infection from one cow to the next.

Timing of Operations

For a single operator milking in a six side herringbone dairy, there is little time available for jobs other than milking cows. Thus, allowing 30 seconds for udder washing and stimulation, 10 seconds to change the cups across the milker's alley, and one

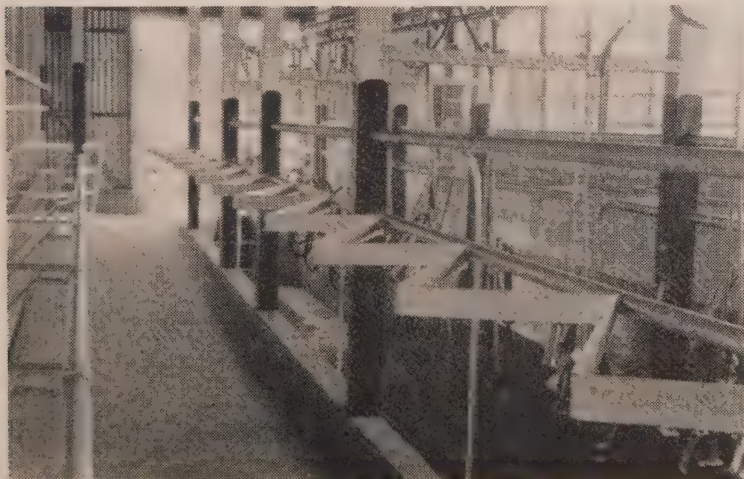


Fig. 5.—In the 13-stand shed built by Mr. J. Miles of Warner Glen, cows enter from the end farthest from the milk room, and passages are provided at each side to return them to a holding yard

minute batch-changing time, the cups would be on each cow for five minutes, and with a six stand shed, it would theoretically be possible to milk 72 cows an hour.

A batch-changing time of one minute would give little time for more than a cursory glance into the milk room to ensure that everything there was in order.

Dealing with Slow Milkers

As mentioned earlier, the speed with which a batch of cows can be put through the shed is limited by the slowest milking cow, unless the farmer recognises every such cow and takes steps to overcome this problem. It seems desirable to have additional units so that the cups can be placed on such cows as soon as they enter the shed.

If this is done, and the slower milker is encouraged to be one of the first of her batch to enter the shed, adequate time for her to milk out thoroughly can be given.

CONCLUSION

In conclusion it is suggested that the herringbone type of dairy could well suit you, provided you know your cows and provided you milk enough cows for the saving in time to compensate for the slight additional cost over the more conventional type of dairy.

When you consider that, for a herd of 60 cows, a saving of one minute a cow each milking amounts to 365 hours a year, it is obvious that an additional £100 in outlay would be money well spent.

BEEF FOR THE ROYAL SHOW



Shorthorn steers on Yarragadee Station, Mingenew. These are part of the team entered by Mr. W. C. K. Pearse (in the background) for the 1961 Royal Show Carcass Competition. Aged 21 months, the steers were raised on natural grazing, with no hay supplement. Yarragadee Station has been a consistent and successful competitor in this competition. The picture was taken during an inspection of the property during the Royal Agricultural Society—Shell Company pre-show journalists' tour

WALNUT GROWING

in the

Bickley Valley

By

E. L. NEAVE, Instructor, Horticultural Division



A good sample of Franquette nuts

WALNUTS require special conditions of climate and soil for satisfactory production and there are few places in this State where commercial plantings have been successfully established. One small planting of interest is located in the Bickley Valley, in the hills close to Perth. The Bickley Valley is best known for its citrus and stone fruits.

Walnuts are grown on several properties in the heart of the valley but the largest block is on Mr. C. G. Watson's property. Fifty trees are planted on approximately two acres of deep fertile soil and although the trees are planted 44 feet apart on the square, at 32 years of age the canopies touch overhead. Cropping commenced at 10 years and increased with tree growth until at present the yield per tree is between 100 and 200 lb., worth over the whole area between £500 and £800 a year.

The following details may be of interest to those contemplating planting walnuts:

Varieties:

Mr. Watson's main variety is Franquette. It produces the most consistent crops and its good medium size, compact nut and good flavour are strong points in its favour. The nuts are also clean, weighty and store well, resisting damage from fungus infection and grubs.

There are also some trees of Wilson's Wonder which although they grow to large size and produce regular crops, are not favoured. Some of the main points against this variety are:—

- (1) The kernel tends to shrink in the shell.

- (2) The shell halves are inclined to separate, encouraging mould development or insect damage.
- (3) The nuts do not bleach well.
- (4) The variety is more prone to black spot than the Franquette.

Freshford Gem is also grown on a small scale on an adjacent property. This variety bears good crops and is a little earlier than Franquette but because of its susceptibility to black spot is not popular.

Growing Conditions:

The trees on Mr. Watson's property are planted on a red-brown loam, flat, deep and well drained. Cultivation since planting has been done either with a disc cultivator or rotary hoe operated at shallow depth.

Sprinkler irrigation has been used to supply summer moisture, applying approximately 1½ inches of water a month.

In their early years the trees were given light dressings of stable manure and mixed fertiliser. The present practice is to apply half a ton of sulphate of ammonia an acre at blossoming.

A view through the walnut orchard showing the size of the trees. The trees are 44 ft. apart, and the canopies meet overhead



Pruning:

Pruning has produced no beneficial results on Mr. Watson's property and is therefore not practised. Walnut trees bleed freely when cut and only limbs which interfere with cultivation should be removed once the tree is established. Such removals should be done during leaf fall to minimise bleeding. In early years of growth it may be necessary to top the young tree to induce branching.

Pollination:

The walnut has separate male and female flowers on the one tree. They are borne on the new season's growth, the male flowers or catkins appearing first. The female flowers are not prominent and

develop three or four inches along the new shoot. Pollination is effected by wind.

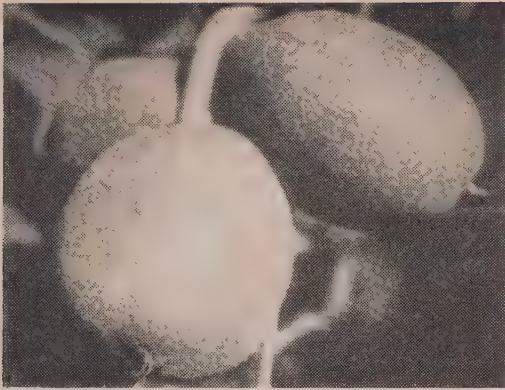
Harvesting and Treatment of Nuts:

Walnuts are harvested during April and May. The green casing enclosing the nuts cracks open and allows most of the nuts to fall to the ground, where they can be gathered. Any nuts which tend to hang to open casings are brought to the ground by beating the branches of the tree with a long stick.

The harvested nuts are racked on wire mesh frames in an open shed and allowed to dry for about 3 weeks. They are then bleached to improve their general appearance. This is done by dipping the nuts, in a wire basket, into a solution of one



An inflorescence showing the male catkins. The female floral parts develop on the terminal portion of the shoot



Maturing walnuts. On maturity the green casing cracks open, allowing the nut to fall

part sodium hypochlorite in 10 parts of water for from two to five minutes. They are then rinsed in fresh water and replaced on racks for two to three days to dry. They are then ready for grading and storage before marketing.

Disease Control:

Black spot is the only disease of walnuts in this orchard. Mr. Watson has success-

fully held this disease in check by a schedule of Bordeaux sprays. Spraying commences just before bud burst with 6-4-40 Bordeaux. Sprays are continued at fortnightly intervals, decreasing in strength until a final spray of 6-6-100 Bordeaux is applied early in February.

Mr. Watson has found walnut growing a remunerative sideline, although a lot of work is entailed in preparation of the nuts for marketing.

There has been no problem in disposing of the crop as most of the State's requirements have to be imported.

For a detailed account of the black spot disease the reader is referred to an article on this subject appearing in this issue of the Journal of Agriculture.

ACKNOWLEDGMENT

Appreciation is expressed of the generous assistance given by Mr. Watson in providing facts and figures for this article. Mr. Walton also took the photographs.

COOKING WITH WALNUTS

To the housewife, knowing how to cook with walnuts is more important than knowing how to grow them. These two recipes give an idea of the versatility of walnuts in the kitchen. They were provided by Mrs. Watson.

WALNUT PIE

Place in a saucepan 1 large onion, finely chopped, and 1 tablespoon margarine. Lightly brown the onions.

Add 3 cups of water or stock, bring to boil.

Blend 2 heaped tablespoons flour or Gravox.

Stir into contents of saucepan, season to taste.

Add 4 oz. ground or finely chopped walnuts.

Peel and slice 1½ lb. potatoes.

Place alternate layers gravy and potatoes in an ovenproof dish.

Top with potato slices and cereal or breadcrumbs, and dot with margarine.

Bake in a moderate oven 2 hours.

Serve hot with vegetables or cold with salads.

WALNUT SAVOURY SLICE

Break 4 oz. macaroni in pieces. Boil until tender, and drain.

Place 1 cup breadcrumbs into a basin.

Add 1 cup boiling milk, allow to soak for 5 minutes.

Add the macaroni

4 oz. ground Walnuts

1 tablespoon chopped parsley

1 tablespoon chopped celery leaves

1 tablespoon chopped onion

Pinch herbs

2 tablespoons melted butter

2 beaten eggs

Salt.

Then steam for 1½ hours.

Turn out of steamer when cold. Slice and serve with salads.

(Place greased paper in bottom of steamer.)

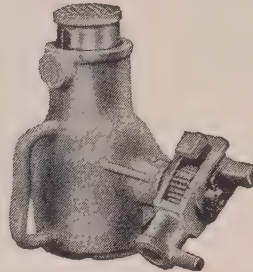
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PLANT DISEASES

BACTERIAL BLIGHT OR BLACK SPOT OF WALNUTS

Bacterial blight is the most important disease of walnuts in Western Australia. In bad seasons it can cause heavy losses in susceptible varieties such as Wilson's Wonder, and in some seedling trees.

Carefully timed sprays greatly reduce the incidence of bacterial blight, and it is also recommended that less susceptible varieties—such as Franquette—should be used for new plantings.

By OLGA M. GOSS, B.Sc. (Hons.), Plant Pathologist, and
R. F. DOEPEL, B.Sc. (Agric.), Plant Pathologist

BACTERIAL BLIGHT is caused by the bacterium *Xanthomonas juglandis* which can infect leaves, nuts and also young shoots of the current season's growth. The disease has been recorded from such widely separated districts as Manjimup and Bickley Valley.

Survival of the bacteria from one season to the next is mainly in infected dormant buds. Fallen fruit and leaves are also potential sources of disease.

SYMPTOMS

On the Leaves:

Black angular spots, usually surrounded by a lighter halo, appear on the leaves. (See Fig 1.) On leaves just emerging from the overwintering buds, the spots are often restricted to the margins and leaf tips, indicating that infection has occurred in the dormant bud during the previous growing season.

These marginal lesions usually cause considerable leaf distortion as a result of checking of growth in infected areas.

Elongated lesions can occur along the veins, midrib and the leaf stalk.

On the Nuts:

On the nuts, the disease produces variable symptoms depending on the stage of flower or fruit development when infection occurs. In the early flowering



Fig. 1—Walnut leaf affected with blight. Note angular blackened spots surrounded by a lighter halo. This leaf also shows the marginal lesions and distortion resulting from early infections as it emerges from the bud

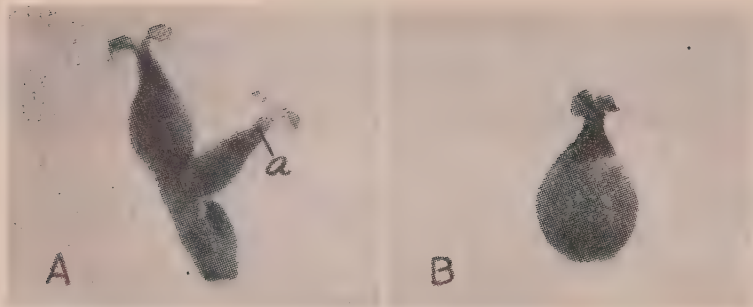


Fig. 2—Young walnut infected during the early flowering stage. Note the blackening at the blossom end. (From Miller and Bollen)

stage infection results in black spots, mainly at the blossom end. (See Fig. 2.) As the nut develops, these spots may enlarge, causing an extensive blackening of the tissues. Usually such infected nuts fall off the tree long before they reach maturity, thus considerably reducing yield.

When infection occurs in the early post-blossom stage, bacteria frequently gain access to the developing ovary and cause a blackening and withering of the kernel which may not be visible externally, but renders the nut useless. (See Fig. 3.)

Later infections occur mainly on the sides of the developing nut and cause depressed, blackened areas ranging in size from a quarter of an inch to over half the surface area of the nut. (See Fig. 4.)

These infections often only invade the fleshy covering and do no actual damage. In some cases however, they may penetrate to the shell and cause discoloration with consequent reduction in market value. (See Fig. 5.)

On the Twigs and Buds:

Young shoots of the current season, and leaf and catkin buds are also susceptible to attack. On the shoots, depressed lesions develop which may encircle the stem and cause dieback of the distal portions. Diseased buds are frequently completely killed, but sometimes the disease attacks only the outer scales. This gives rise to the emerging diseased leaves referred to above.

CONDITIONS FAVOURING THE DISEASE AND ITS TRANSMISSION

Development of the disease is favoured by cool, moist conditions. The occurrence of rainy periods during November, December or January when the nuts are developing, is likely to give a build-up of the disease and considerable loss of crop. During wet weather, bacteria ooze from the lesions in droplets and are spread by water splash.

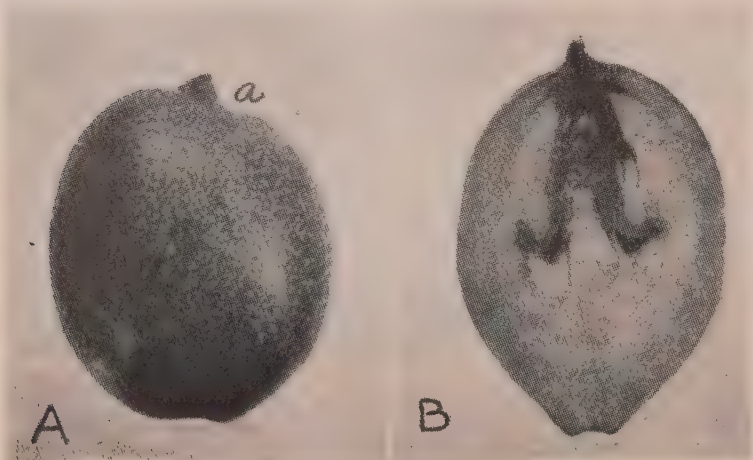
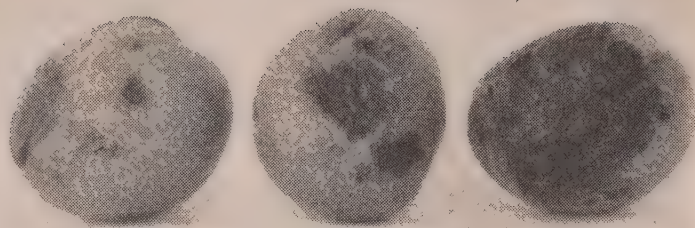


Fig. 3—Walnuts infected internally by bacterial blight.

- (A) An internally infected nut as seen from the exterior—the only visible evidence of infection is a slight depression (a) in the tissues at the apex.
- (B) A longitudinal median section through an internally infected nut. Note the extent of invasion within. (From Miller and Bollen.)

Fig. 4—Mature walnuts showing symptoms of bacterial blight. Note the depressed black lesions which may extend to almost cover the fruit



CONTROL

1. Where practicable, remove diseased wood from the trees—this is more important in young trees to avoid building up a source of inoculum.

2. Adopt a routine spray schedule using Bordeaux 5 : 2 : 100 plus $1\frac{1}{4}$ pints of white oil per 100 gallons as follows:—

- (a) Early pre-bloom when 50 per cent. of the terminal buds have broken.
- (b) Late pre-bloom—just before most of the female flowers come into full bloom.
- (c) Early post bloom—when the young nuts are about $3/16$ in. in diameter.
- (d) If later rains occur, one or more further sprays may be necessary to keep the disease in check.

The sprays should be applied in mist form with high pressure (400 lb. per square inch is desirable) and every effort made to reach the tops of the trees.

3. Fallen fruit and leaves should be raked up and disposed of by either ploughing in or burning, to reduce carryover of the disease.

SPRAY EXPERIMENTS

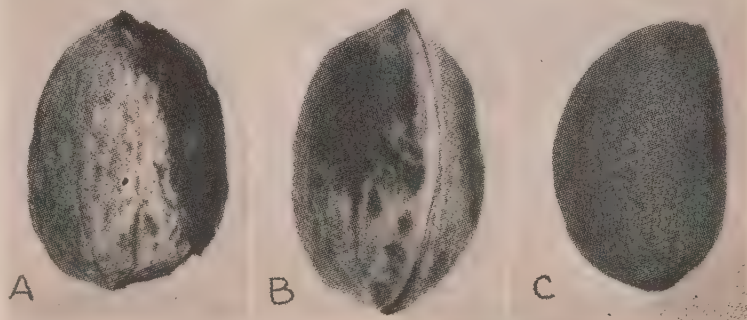
Departmental trials using various spray schedules, including streptomycin, have been carried out over a number of years. Although all sprays gave some measure of control, they proved inferior to the above recommendation of Bordeaux 5 : 2 : 100 and also to the commonly used 6 : 4 : 40 Bordeaux. This latter spray may give better control, but causes some burning of the foliage.

REFERENCE

Miller, P. W., and Bollen, W. B.—Walnut Bacteriosis and Its Control. Oregon Agricultural Experimental Station, Technical Bulletin 9, 1946.

Fig. 5—The effect of bacterial blight on the shape and quality of the nuts.

- (A) Diseased part of hull adhering tightly to the shell at maturity.
 - (B) Brown stain left on shell after lesion in the hull is scraped off.
 - (C) Misshapen nut caused by the presence of a lesion in the hull.
- (From Miller and Bollen.)



COMMON BEAN MOSAIC

By W. P. CASS SMITH, B.Sc. (Agric.), Superintendent, Division of Biological Services

COMMON bean mosaic is a widespread disease which attacks both dwarf and pole bean varieties. The disease is caused by an infective principle or virus which spreads throughout the sap of affected plants, and causes both delayed maturity and drastic reduction in yield.

Unlike most plant viruses, common bean mosaic virus is seedborne, and if plants are grown from infected seed they serve as reservoirs from which the disease is spread throughout the crop by aphids during their feeding activities.

The prevention of losses therefore depends largely on the use of good quality seed which has been carefully selected from mosaic-free plants. Where this procedure is not carried out and seed is con-

tinually saved in bulk from the "tail-end" of crops marketed as green beans, a progressive disease-increase and decline in yield may be anticipated.

SYMPTOMS AND EFFECTS

The characteristic symptoms of common bean mosaic include mottling and malformation of the foliage, stunting of plants and delayed maturity. However, symptoms may vary somewhat according



Fig. 1.—Leaves of the "Vincent" dwarf bean variety (top) and "Golden Harvest" pole bean variety (at bottom) showing symptoms of common bean mosaic. Note particularly the mottling, and downward-cupping of the leaves, and the raised, dark blister-like areas, which show prominently on the leaves on the right

to the variety, the environmental conditions under which it is grown, and the time of infection.

Plants grown from infected seed often show symptoms on the first trifoliate leaf, consisting of light green or yellowish, and dark green, irregularly shaped areas. The margins of the leaflets are generally cupped downwards or otherwise distorted.

Later-formed leaves may, in addition, develop considerable puckering, or blistering in the form of raised dark green areas, and show reduction in size. Very occasionally, raised dark green areas may appear on the pods also.

Common bean mosaic seldom kills the plants outright, but those grown from infected seed give little yield.

Plants becoming diseased at a later stage produce more seed, but much of this is infected with mosaic. The market quality is reduced, for the pods are generally late-maturing and undersized.

CONTROL

1. As bean plants grown from infected seed are the main source of mosaic in the crop, only high quality seed, which has

been saved from selected healthy plants, should be used. Certified seed of the pole bean varieties Westralia and Golden Harvest, which meets this specification, is now produced locally in limited quantities.

2. Growers who raise their own seed stocks should plant special seed plots for this purpose. Each plot should be planted with certified seed, or, if this is unprocurable, with seed of the best quality obtainable. It should be well isolated to reduce the risk of infection by migratory aphids from adjacent bean crops.

As aphids are usually most prevalent in the cooler spring and autumn months, delaying the planting of this plot until the advent of warmer weather in early summer is advisable.

The plot should be inspected each week throughout the growing season, and any diseased plants should be rogued out and destroyed. Roguing is facilitated by thin sowing, wide spacing, and in the case of pole bean varieties, by training each plant up a single trellis stake.

3. The rust resistant Westralia variety is also resistant to common bean mosaic, whereas Golden Harvest is very susceptible.

SIMPLE STANDARD NAMES FOR FUNGICIDES

Many of the newer fungicides are so complex in composition that simple standard names have been adopted, by international agreement, to represent their chemical constituents. For example ziram is the name given to zinc dimethyl dithiocarbamate and all proprietary preparations containing this compound are referred to as ziram-type fungicides. Standard names of some other fungicides include thiram, zineb, captan, chloranil, dichlone and dodine.

These simple standard names are usually displayed on trade labels in conjunction with the chemical formula. By reference to the label growers can ensure that a proprietary brand of fungicide is of the required type.

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PLANT DISEASES IN WESTERN AUSTRALIA

SUPPLEMENTARY LIST OF DISEASES RECORDED ON VEGETABLES, CEREALS, GRASSES AND PASTURE LEGUMES

By S. C. CHAMBERS, M.Sc., Plant Pathologist

This first supplement contains the diseases recorded on vegetables, cereals, grasses and pasture legumes, in the period between the publication of the revised lists (1), (2) for these hosts, and June 30, 1961. No records of diseases on artificially infected host plants have been included in the list.

HOST	CAUSE	COMMON NAME	FIRST RECORD		
			Place	Month	Year
VEGETABLES					
<i>Allium cepa</i> L. (Onion)	<i>Erwinia caratovora</i> (Jones) Holland	Bacterial Soft Rot ...	Toodyay	February	1960
<i>Apium graveolens</i> L. (Celery)	<i>Cucumber Mosaic Virus</i> <i>Pratylenchus penetrans</i> Cobb	Mosaic Meadow Nematode	Balcatta Balcatta	May April	1959 1958
<i>Beta vulgaris</i> L. Var. <i>cicla</i> L. (Silver Beet)	<i>Heterodera schachtii</i> A. Schmidt Pathogen Not Recorded	Sugar Beet Eelworm Damping Off	Osborne Park Balcatta	June October	1959 1959
<i>Brassica napobrassica</i> Mill. (Swede)	<i>Plasmodiophora brassicae</i> Woron. <i>Pratylenchus penetrans</i> Cobb	Club Root Meadow Nematode	Kelmscott Mandogalup	February January	1958 1960
<i>Brassica oleracea</i> L. Var. <i>botrytis</i> (Cauliflower)	<i>Cabbage Black Ringspot Virus</i> Smith Genetic	Black Ringspot Virus Albinism or Variegation	Wanneroo ... Albany	May November	1961 1959
<i>Brassica oleracea</i> L. Var. <i>capitata</i> L. (Cabbage)	Genetic	Albinism or Variegation	Geraldton	June	1958
<i>Brassica oleracea</i> L. Var. <i>gemmifera</i> Zenker (Brussels Sprouts)	<i>Erwinia carotovora</i> (Jones) Holland	Bacterial Soft Rot ...	Metropolitan	May	1961
<i>Brassica oleracea</i> L. Var. <i>capitata</i> L. (Cabbage)	<i>Pellicularia filamentosa</i> (Pat.) Rogers	Albinism or Variegation	Geraldton	June	1958
<i>Brassica oleracea</i> L. Var. <i>gemmifera</i> Zenker (Brussels Sprouts)	<i>Erwinia carotovora</i> (Jones) Holland	Bacterial Soft Rot ...	Metropolitan	May	1961
<i>Brassica oleracea</i> L. Var. <i>italica</i> Plenck (Broccoli)	<i>Pellicularia filamentosa</i> (Pat.) Rogers	Wire Stem	Metropolitan	May	1961
<i>Capsicum annuum</i> L. (Pepper)	<i>Erwinia carotovora</i> (Jones) Holland Non-Parasitic	Bacterial Soft Rot ... Blossom End Rot	Metropolitan ... Midland Junction	June March	1959 1960
<i>Chichorium intybus</i> L. (Chicory)	<i>Sclerotinia sclerotiorum</i> (Lib.) de By.	Sclerotinia Rot	Bedfordale	July	1960
<i>Citrullus vulgaris</i> Schrad. (Water Melon)	<i>Meloidogyne javanica</i> (Treub) Chitwood	Root Knot Eelworm ...	East Cannington	April	1961
<i>Cucumis melo</i> L. (Rock Melon or Cantaloup)	<i>Fusarium oxysporum</i> f. <i>niveum</i> (E. F. Smith) Snyder et Hansen <i>Fusarium solani</i> f. <i>cucurbitae</i> Snyder et Hansen	<i>Fusarium</i> Wilt Root Rot	East Belmont Herne Hill	January December	1958 1959
<i>Daucus carota</i> L. (Carrot)	<i>Alternaria dauci</i> (Kühn) Groves et Skolko <i>Cylindrocarpon species</i> <i>Ditylenchus dipsaci</i> (Kühn) Filipjev <i>Pratylenchus penetrans</i> Cobb	Leaf Blight Skin Blemish Stem Eelworm ... Meadow Nematode Damping Off	Spearwood Albany Osborne Park Balcatta Metropolitan	February May May June December	1960 1959 1959 1958 1960
<i>Hibiscus esculentus</i> L. (Okra)	<i>Meloidogyne species</i>	Root Knot Eelworm...	West Perth	February	1958
<i>Ipomoea batatas</i> (L.) Lam. (Sweet Potato)	<i>Rhizopus nigricans</i> Ehr. ... <i>Meloidogyne javanica</i> (Treub) Chitwood	Soft Rot Root Knot Eelworm	Wembley Meekatharra ...	May February	1960 1961
<i>Lactuca sativa</i> L. (Lettuce)	<i>Aster Yellows Virus</i> <i>Pratylenchus penetrans</i> Cobb	Aster Yellows Meadow Nematode	Albany Osborne Park	November April	1959 1959
<i>Lycopersicon esculentum</i> Mill. (Tomato)	Cause Unknown	Internal Browning of Fruit	Spearwood	May	1959

HOST	CAUSE	COMMON NAME	FIRST RECORD		
			Place	Month	Year
<i>Pastinaca sativa</i> L. (Parsnip)	<i>Hersonilia</i> species <i>Pratylenchus penetrans</i> Cobb	Canker Meadow Nematode	Osborne Park ... Balcatta	November June	1960 1958
<i>Petroselinum hortense</i> Hoffm. (Parsley)	<i>Pratylenchus penetrans</i> Cobb	Meadow Nematode	Osborne Park ...	April	1959
<i>Phaseolus vulgaris</i> L. (French Bean)	<i>Botrytis cinerea</i> Fr. Cause Unknown	Grey Mould Blackening of Pods	Carnarvon ... Northam	September December	1958 1959
<i>Raphanus sativus</i> L. (Radish)	<i>Aphanomyces raphani</i> Kendr.	Black Root	Osborne Park ...	February	1958
<i>Rheum rhaponticum</i> L. (Rhubarb)	<i>Heterodera schachtii</i> A. Schmidt ... <i>Pratylenchus penetrans</i> Cobb	Sugar Beet Eelworm ... Meadow Nematode	Spearwood ... Metropolitan	February April	1959 1961
<i>Sechium edule</i> Sw. (Choko)	Non-Parasitic	Heat Injury	Pinjarra	May	1960
<i>Solanum melongena</i> L. (Egg Plant)	Non-Parasitic	Heat Injury	Wanneroo ...	December	1959
<i>Solanum tuberosum</i> L. (Potato)	<i>Potato Calico Virus</i> <i>Meloidogyne hapla</i> Chitwood <i>Meloidogyne javanica</i> (Treub.) Chitwood Non-Parasitic	Calico Root Knot Eelworm ... Root Knot Eelworm ... Second Growth	Metropolitan ... Manjimup Burekup Manjimup	July June September May	1960 1961 1958 1958
<i>Vicia faba</i> L. (Broad Bean)	<i>Pea Mosaic Virus</i> Doolittle et Jones	Pea Mosaic	Metropolitan ...	October	1959
PASTURE LEGUMES					
<i>Lupinus digitatus</i> Forsk. (W.A. Blue Lupin)	<i>Glomerella cingulata</i> (Stonem.) Spauld. et Schrenk <i>Meloidogyne</i> species	Anthracnose Root Knot Eelworm ...	Boyup Brook ... Busselton	September October	1960 1960
<i>Lupinus luteus</i> L. (Yellow Lupin)	<i>Meloidogyne</i> species	Root Knot Eelworm ...	Witchcliffe	November	1960
<i>Medicago sativa</i> L. (Lucerne)	<i>Pellicularia rolfsii</i> (Curzi) West	Crown Rot	Porongurups ...	February	1960
<i>Medicago tribuloides</i> Desr. (Barrel Medic)	<i>Phoma</i> species	Black Stem	Tincurrin	September	1960
<i>Pisum arvense</i> L. (Field Peas)	<i>Meloidogyne</i> species	Root Knot Eelworm ...	Witchcliffe	November	1960
<i>Trifolium subterranean</i> L. (Subterranean Clover)	<i>Meloidogyne incognita</i> (Kofd. et White) Chitwood	Root Knot Eelworm ...	Denmark	June	1960
CEREALS AND GRASSES					
<i>Agrostis stolonifera</i> L. (Bent Grass)	Non-Parasitic	{ Heat Injury ... Brown Patch... }	Metropolitan ...	March	1961
<i>Avena sativa</i> L. (Oats)	<i>Helminthosporium victoriae</i> Meehan et Murphy	Helminthosporium Blight	Boddallin	November	1960
<i>Lolium arvense</i> With. (Awnless Darnel.)	<i>Puccinia</i> species	Rust	Woogenellup ...	November	1960
<i>Oryza sativa</i> L. (Rice)	<i>Fusarium</i> species	Foot and Root Rot ...	Ord River	May	1960
<i>Poa pratensis</i> L. (Kentucky Blue Grass)	<i>Puccinia poarum</i> Niels Non-Parasitic	{ Rust Brown Patch... Heat Injury ... }	Dumbleyung ... Victoria Park ...	June March	1961 1961
<i>Secale cereale</i> L. (Rye)	<i>Alternaria</i> species <i>Puccinia graminis tritici</i> Eriks et Henn Race 21-2	Black Mould Stem Rust	Boyup Brook ... Mendel	February October	1960 1960
<i>Themeda australis</i> (R.Br.) Stapf. (Kangaroo Grass)	<i>Puccinia ? versicola</i> Diet. et Holw.	Rust	Mayanup	November	1960
<i>Triticum vulgare</i> Vill. (Wheat)	<i>Fusarium acuminatum</i> Ell. et Ev. <i>Fusarium avenaceum</i> (Fr.) Sacc. <i>Fusarium equiseti</i> (Cda.) Sacc. <i>Fusarium sporotrichioides</i> Sherb. <i>Puccinia graminis tritici</i> Eriks et. Henn Race 21-2 Genetic Non-Parasitic	Foot and Root Rot ... Foot and Root Rot ... Foot and Root Rot ... Foot and Root Rot ... Stem Rust Leaf Flecking Hail Injury	Wongan Hills ... Avondale Esperance Avondale South Borden ... South Perth	November January February February January September January	1960 1961 1960 1961 1960 1960 1960
Lawns and Turf (Various Grasses)	<i>Helminthosporium</i> species	{ Root Rot Brown Patch... }	Geraldton ...	July	1960

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(1960)—Ibid. Series 4 Vol. 1 pp. 927-934.

FALLOWING AND SOIL CONSERVATION

Soil Conservationists don't always disapprove of fallowing, says Soil Conservation Service adviser J. E. Watson. They are prepared to compromise, and accept fallowing as a useful practice where it means better pasture establishment or more effective land reclamation.

MANY farmers believe that soil conservationists condemn the practice of fallowing, but in fact there are circumstances in which we strongly recommend that land should be fallowed.

The best friend of the soil conservor is grass. It protects the surface soil from the direct force of the wind and rain, and its roots improve the structure of the soil and make it more resistant to erosion.

So it is natural that the soil conservationist thinks carefully about the practice of fallowing, which destroys the grass cover in midwinter and leaves the soil bare and exposed throughout spring, summer and autumn.

Obviously, land should not be fallowed unless it is really necessary.

The less time that the soil is left cultivated and bare, the less chance there is of it being damaged by a severe wind or rainstorm. Also, fallowing often means extra cultivation of the soil before it is cropped. From the soil conservation point of view each cultivation breaks up the soil and makes it finer and more liable to removal by wind or water. So we recommend the principle of minimum tillage—that is the least possible number of cultivations, consistent of course with satisfactory weed control, adequate seed bed preparation and a profitable crop.

Keeping in mind these general principles of minimum tillage and minimum period of exposure of bare soil there are times when we think fallow is necessary and likely to reduce the overall erosion hazard rather than increase it.

A.—CLEARING AND DEVELOPING NEW LIGHT LAND

The Departmental recommendation is that the native scrub should be knocked down by rolling, logging or chaining and

the dead vegetation destroyed by fire in late summer. Disc ploughing four inches deep in winter will then give the good fallow required to prepare the new land for cropping the following year.

In the past many farmers have avoided this year of bare fallow of new land, either taking a short cut and trying to save a year, or perhaps believing that bare fallow created an erosion hazard and was therefore against soil conservation principles.

Taken on its own the year of bare fallow does make the soil more exposed to erosion, but we must consider the whole period of development until the land is thoroughly cleared and sown to pasture.

If the fallow year on new land is eliminated there are two main hazards.

- The crop may not yield well enough to even repay the cost of cultivating, seeding and harvesting.
- The stubble may not be thick enough to carry the fire which is necessary to kill the sucker regrowth of the crop year.

If the stubble will not burn it has to be ploughed in, thus reducing the chances of a paying crop in the second year.

Regrowth not brought under control in the first couple of years may require repeated ploughings and fallowing at a later stage, when it would be much more hazardous than in the initial year.

Worse than this, we have seen many areas where the regrowth has been allowed to get out of control. On these areas there is no pasture cover and lots of bare soil between the scattered suckers making a

severe hazard for both wind and water erosion.

Even if we escape these more serious consequences of the non-fallow short cut it will almost certainly take much longer to establish a satisfactory pasture cover, and surely, from a soil conservation point of view, the chief aim in developing new land is to quickly obtain a good pasture cover as part of a soil building rotation. To achieve this aim we are convinced that an initial period of bare fallow is essential on new light land.

This does not mean that we should not take care. On vulnerable soils priority should be given to doing each operation at the best time to reduce the chances of erosion. We suggest a procedure such as this:—

Knock down the scrub early in summer to give it plenty of time to dry out for a good burn.

Burn it as late as possible in the autumn, then fallow the soil as early as possible in winter. This reduces to a minimum the period when the soil is bare and smooth after the burn.

A good disc ploughing to a depth of four inches at slow speed will leave the surface rough and cloddy. In this condition the soil is receptive to rainfall and resists movement by wind.

On sloping land the ploughing should be done on the contour to further reduce the possibility of water run-off.

The fallow must not be worked back in the spring. It should not be cultivated again until after the first autumn rains the next year.

If this procedure is followed even the most hazardous soil types can be developed as recommended with little danger of serious erosion.

All farming practice is a compromise between various aims. In this case the conservation principle of minimum exposure of bare soil must be secondary to the thorough preparation and development of new land.

B.—RECLAIMING GULLIED SLOPES

Fallow is often recommended by soil conservationists when badly gullied or rilled slopes are being reclaimed. Such paddocks are usually poorly pastured and the loss of grazing caused by fallowing is not very great.

Filling the gullies and building the banks is best done when the soil is moist. If done straight after seeding the later winter rains will help to consolidate the loose soil in the banks and filled gullies.

However, these rains and summer storms could give the banks a severe test, with high run-off from the bare filled gullies and the poorly pastured land between the banks. For this reason the paddock should be fallowed immediately, in contour lands between the banks.

This should be a good working to four inches, with a tined implement or a disc plough at slow speed, to leave contour working furrows with a large capacity for holding water. The fallow should be left rough and not worked back in the spring.

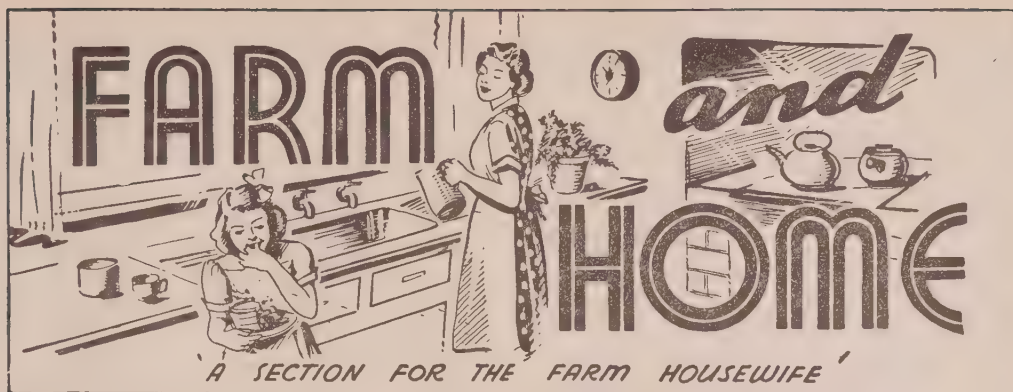
The contour fallow done in this way will reduce run-off to a minimum. The banks and filled gullies will have almost a full year to consolidate before the time of most erosion hazard—the period from seeding until the crop is about six inches high.

The fallow can be worked back immediately after the first winter rains and seeding done early. An early seeded crop on fallow should make quick growth and reduce the danger period.

To reduce the chance of stock damage to the newly constructed banks there should be little grazing during the fallow period. The banks will grass over quickly in the crop year and be well consolidated before stock graze the stubble after harvest.

No single practice is likely to be condemned outright by soil conservationists. It is only when such practices as fallow and burning are wrongly used for soil exploitation that the consequent loss of fertility and soil structure become serious erosion problems.





CURTAINS

By O. EVANS SCOTT

TO a housewife, spring and spring cleaning are practically synonymous. At this time we look with a stranger's eyes at our furnishings, changing them, cleaning, and making or buying new things.

A change in curtains can be relied upon to give a spring "face-lift" to any home.

CHOOSING CURTAIN FABRICS

Before buying, many points need to be considered.

If the room is dark, choose a light coloured fabric, and if the other furnishings are rather sombre, a clear bold colour can make it more cheerful.

Colours

Avoid colours which fade badly. Most blues and mauves are affected by sunlight and so are the oppressive colours like deep purple, bright oranges, and cyclamen and fuchsia pinks. Colours can vary under different lighting, so make sure you see the fabrics in both daylight and electric light before choosing.

If the room receives too much daylight, a heavy fabric in a soft deep colour should be suitable, or a medium weight fabric could be lined with calico or headcloth to both protect from sunlight and throw a different light into the room when the sun shines.

For a lounge or dining room choose a better type of material than that for a kitchen. Dress curtains are lined and

interlined to give added weight, make them hang better, and keep out more light. The lining may be of unbleached calico, special twill-woven curtain lining, plain coloured fabric or the same fabric as the curtains. If an interlining is desired, choose flannelette or calico.

Patterns

Patterned fabrics need careful study, as they can restrict other decorating. An attractive pattern seen spread flat can be broken by the folds of the curtain when hung to look quite unattractive. If the floor covering is patterned, choose a plain curtain to avoid an uneasy, cluttered effect. Even if a patterned curtain is effective in a tidy, empty room, the effect can be lost when the room is in use. Generally, large, high-ceilinged rooms can take large patterns; smaller rooms need smaller patterned, textured, or plain curtains.

Patterns on curtains need to be matched when making, thus extra material will have to be allowed, the amount depending on how often the design is repeated, and the depth of the curtain drop. The base

pattern should be several inches up from the lower edge to allow for the hem, and about two or three inches below the top heading if possible.

If a large pattern is repeated across the fabric a little lower each time—that is, not on the straight grain—cut not to the thread but to the pattern. If, however, the drop is more than three inches, do not buy, as when matched the diagonally sloping series of patterns will give an illusion of uneven hanging and hem level. When in doubt, choose a plain or self-textured fabric.

Stripes could be used to give height to a low-ceilinged room, but only if upholstery is the same fabric (like in a Regency stripe) or if the furniture and floor coverings are plain.

Choose a fabric in accordance with the furniture and character of the room: Hang Jacobean patterned fabric with oak Jacobean furniture, plain satin or brocade with Queen Anne; contemporary print or bright colour in a room with modern furniture, and so on.

Fabrics

As with clothing fabrics, look for colour almost as deep on the wrong as on the right side, and avoid thinly woven or light fabrics with a lot of size or dressing. (Scrub gently several times on the palms of the hands as if washing, then look for a white powdery substance). These fabrics are likely to fade, shrink, and wear out more quickly than better fabrics.

If light net curtains are desired, look closely at the weave before buying. In the true gauze weave the warp or selvedge-way threads are in pairs, and twist about each other in between every weft or cross thread. This forms a very strong, light fabric which wears very much better than the under-and-over, plain woven net.

If you plan to invert curtains after laundering for more even wear, see that any pattern looks just as attractive upside down. (Some kitchen curtain fabrics depicting shelves and crockery, for example, could not be inverted.)

For a sewing room or study, choose and hang curtains so that maximum light without glare can be obtained. Approximately 70 per cent. of the light in a room enters through the top third of the window, therefore in a dark or small windowed

room leave this section uncurtained. The lower half could be curtained cafeteria-style. Many a housewife has wished that window blinds would pull upwards from the sill instead of down from the top.

For kitchen and bathroom use there is a large range of light weight, pretty and practical plastic curtain material, which looks surprisingly like cotton fabric.

Other modern developments in furnishing fabrics include permanently glazed chintzes; glass-fibre fabric which is soft, light, shiny and fireproof; terylene nets and laces which are strong, light and "drip-dry"; and velvets and chenilles with synthetic fibre pile which resists dust longer and makes home laundering easier.

PELMET AND VALANCE

These terms, now practically interchangeable, were originally quite distinct. Valance came from the name of the French town of Valence, near Lyons, and meant the hangings of a window or bed—*soft* falling fabric. The pelmet was a *stiffened* frame open at the top, used to hide the curtain top and fittings.

A pelmet can be made from stiff buckram or vilene, covered, draped or upholstered with the curtain fabric. It is now more commonly made from polished, painted or papered wood, and the top is usually covered to allow for the tracks for double-pulleyed side-drawing curtains or other fittings. It also protects the curtain tops from dust while providing a ledge for ornaments, etc.

A good pelmet can greatly enhance the appearance of a window, and behind it the simplest and most economical methods of curtain hanging can be hidden.

The proportion of the depth of the valance or pelmet needs to be watched to avoid a top-heavy or otherwise unsatisfactory effect. As a general rule a valance should be about one-sixth of the curtain drop. Avoid a valance on small windows and sill-length curtains.

A pelmet should be from one-eighth to one-sixth of the total height. It may be shaped, being narrower at the middle or scalloped or turret-edged; and the upper edge may be curved or otherwise shaped upwards to give height. With a low ceiling keep the pelmet plain and narrow.

CALCULATING AMOUNT OF MATERIAL

Width

As a general rule, for light, transparent fabrics allow three times the finished width; for brocades and prints twice the width; and for heavy rich fabrics like velvet allow one and a half times the finished width, taken when curtains are across the window. Often curtains are quite attractive when pulled aside but are skimpy when drawn across. Most curtain fabrics are 45 in. to 48 in. wide, and curtains should be hung so that the selvedge grain of the material runs vertically.

Length

Measure the finished length desired, then allow for hems and the first hem turnover. If material is at all likely to shrink, allow also for a two or three inch tuck to be sewn just under the top hem.

Add these amounts to the length, then double or treble or otherwise according to the number of widths required. If a valance or pelmet is to be used, add the necessary amount, plus turnings and hems, to the total. If the pelmet covering is to be draped or ruched, allow two or three times the finished depth, remembering that the selvedge grain should still run vertically.

The longer the curtain the deeper the lower hem. Floor length curtains can carry a six or eight inch hem, which helps them to fall nicely. If necessary, extra weight can be obtained by placing lead weights inside the hem or inside little patches sewn at the back of the hem.

If curtains are not to be lined, allow for a two-inch hem down the sides. If lining is to be used, buy the same amount as the fabric unless extra has been allowed for matching patterns.

The method of hanging the curtain can influence the amount of turning to allow. A ready made tape can be bought, having two cords running through it which can be pulled up, drawing the curtain into folds. This can be sewn to the curtain top as a facing, thus no allowance for hem need be made.

If frills are desired, measure the complete length, then double this for a narrow or centre-gathered frill, or treble it for a wider frill. After deciding width of frill, add turnings and calculate how often this

width has to be cut from across the fabric. Sometimes frilling can be cut from along a selvedge, avoiding a hem. The ruffler attachment and the small hemming foot on the sewing machine will speed this section of the work.

MAKING AND HANGING CURTAINS

The material should be hung for at least a week to allow for stretching before being made up. Although it is not professionally correct to finish the top before the bottom it is certainly very much easier!

Place material flat for cutting—a large cleared table or floor is best—and cut along the straight grain. (Draw out a thread to make grain line more easily visible). If the selvages are tight, make small $\frac{1}{4}$ in. nicks at 2 in. intervals. Make seams about an inch wide, and on outside edges turn down almost a two-inch hem.

When sewing, a longer machine stitch is used—eight or 10 stitches to the inch. Check by sewing a long sample seam to see that there is no puckering which would spoil the fall of the curtains—loosen tension if necessary. Use a smaller stitch for fine nets and laces.

Tape

The ready-made ruffling tape to make curtains pleat nicely is obtainable in both light weight, narrow width, suitable for light fabrics, and a heavier weight wider type. There are several different types of hooks available for use with the tape, enabling curtains to be hung on the same brand track and runners, on rods, wires, or flat rails. There are several sizes of curtain rings, among them split rings like key rings which do not need sewing on but are merely slipped through the inner tape. A hard nylon track and nylon runners are also available to make curtain drawing an easy silent operation.

Another method is to cut a piece of ordinary tape the required width, and divide it and the hemmed curtain top into half, quarters and eighths. Mark, then pin the corresponding marks together, tape on wrong side, and pleat the curtain fullness in each section to the tape. Hang by means of hooks or rings attached to the tape.

Rings

Curtain rings sewn to the tape or to the unpleated curtains can be threaded on a

rod or conduit. If the top of the curtain is likely to fall over, interline the hem and top of the curtain with a strip of vilene.

When hanging curtains by means of a rod threaded through a hem or a casing, have the casing just wide enough for the rod to thread through easily. If it is too wide it spoils the gather and frill effect. However, when using extension curtain wire and cup hook and eye fittings, allow for the casing to be a little wider than the eye. Although the narrower casing looks more attractive, the eye can not be removed from the wire, so the wider casing allows the wire to be drawn out for laundering.

Lining

When lining and interlining curtains, place the materials together and treat as one for the top hem or attach the lining to the right side of the curtain, machine across top and down the two sides, then turn right sides out as for an invisible facing. The lower hems should be finished separately, the outer one by hand if possible for an invisible finish. Hide the side join between curtain and lining by cutting the lining four inches narrower than the curtain or taking in four inches by tucks. Thus the seams are on the inside of the curtain and two inches in from the end.

CURTAIN TREATMENTS WITH A DIFFERENCE

Instead of allowing a single curtain to fall straight, draw it across to one side about two-thirds down. Balance with a pot plant, small book shelf or colourful ornament at the other side.

Two curtains are often drawn aside at the same level. For a change, try drawing one side almost one-third down and the other side two-thirds down. Place a tall vase just off-centre nearer the high-drawn curtain. The curtains could also be crossed; this is suitable for light lacy curtains in a wide window or long drapes in a narrow window.

Outsize bobble braid or fringing is an effective trim for gingham, plain poplin or any bright colour. The top of the valance or pelmet could be trimmed similarly.

Plain fabrics lend themselves to trimming by applique, bold cross stitch designs, hand painting or stencilling, braids, or

lines of fancy stitching. Beads, sequins and simple tinsel thread embroidery could dress up dark chenille or crushed-velvet drapes for evening entertaining—sew into the folds so that it is not seen by day when curtains are drawn aside.

A small window can be made to appear much larger by placing the pelmet or cornices and fittings well above the window and extending as far as desired each side. Hang side curtains so that the inside edges are level with the sides of the window frame, and hang the valance or short curtain so that it just hides the upper window frame.

Draw attention to an insignificant window by erecting a pelmet above it and covering it with an attractive wallpaper or painting it to contrast with the wall colour. If the curtain and other furnishings are quite plain, the whole window could be surrounded with the band of colour or wallpaper frieze. There are several types of contact or self-sticking plastic baize which would be most effective. See that it contains the basic colour of the room and if striped, mitre the corners.

Cafeteria-style curtains are attractive and practical in the kitchen, particularly if curtains blow in annoyingly over the sink or working area. Instead of one long drop, have two short drops, allow the upper ones to just hide the top of the lower ones or frills to come just edge-to-edge with extension curtain wire in each hem casing.

A delightful rainbow effect for a dark room can be obtained in a wide or corner window by using light net curtains of varying pastel colours. Use a width of each colour in order, allowing three or four times the finished width when buying. If selvages are dense, cut off and machine a narrow rolled hem, or if the panels are to be joined use a narrow French seam. A very pretty way of holding these curtains aside is to loosely plait with just two turns before securing. A graduation of colour can be obtained by using several shades of the one colour.

LAUNDERING CURTAINS

Follow the normal methods for each type of fabric, keeping the following points in mind:—

Curtains need gentle shaking to remove dust, then soaking in salted water and two or three changes of water before washing.

A vinegar rinse helps to brighten faded colours. Be sure that all soap is rinsed out of synthetic fabrics—rayon, nylon and terylene—and dry in the shade to avoid weakening by sunlight.

A little powdered alum dissolved in the starch helps fabrics resist fire, and also restores the shine to glazed chintzes.

A little white wax or turpentine added to the starch will help prevent the iron sticking.

Iron hems and frills before the main part of the curtain, and iron on the right

side unless fabric is textured or damask. Iron with the straight grain. On light cotton and net curtains iron across from side to side, hang before they are absolutely dry and pull gently into folds.

Do not wring or iron velvet or chenille—hang out carefully and smooth water out of pile with hands. Shake often while drying and brush if necessary. Marks may be removed by steaming—hold a damp cloth to the surface of the iron till steaming then stroke the curtain the way of the pile.

“RED FOR SAFETY” IN CHILDREN’S CLOTHES

RED is the strongest of the “advancing” group of colours, so it is easy to understand why it was selected as a danger colour—we see it sooner than other colours.

Everyone is familiar with the signals red for “stop” and green for “go”, interpreting them in colours as red for “danger” and green for “all clear”.

Miss Nancy Foskett, Senior Extension Officer (Women’s Service), New South Wales Department of Agriculture, suggests making practical use of this “hit you in the eye” characteristic of bright colours for children’s clothing.

Margin of Safety.

These colours provide a margin of safety, that extra fraction of a second warning, which can spell the difference between life and death when a child runs unthinking, on to the road or in front of the tractor, after a pet puppy or a lost ball.

Mothers are urged to dress their youngsters (particularly the little ones who have no sense of danger) in red, or other equally vivid colours.

An added advantage of brighter children’s clothing is that children are easier to find if they wander away or get lost at bush picnics or on the beach.

Protect People.

Today, people are using colours for safety in many other ways too. For example, tests by United States railroad companies show that there is safety in colour combinations of orange and black, or orange and royal blue for train extensions.

These ensure year round visibility in any part of the country and have reduced the risk of level crossing accidents.

—N.S.W. Department of Agriculture.

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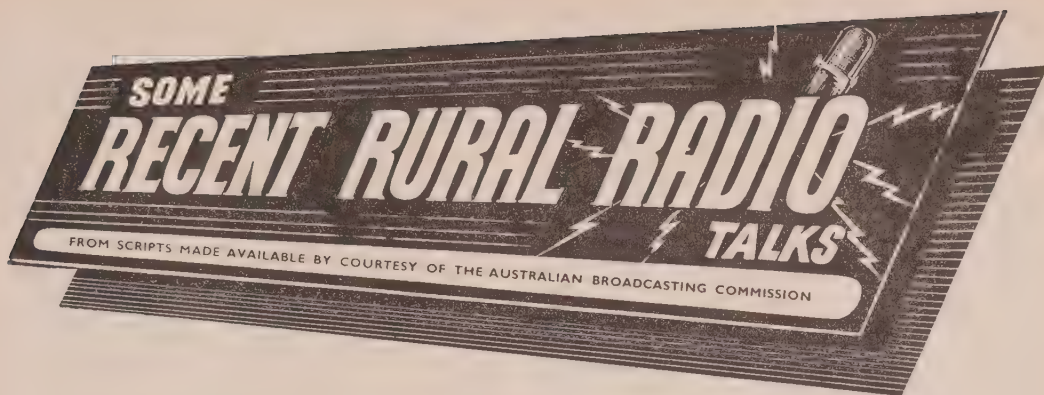
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COLLECTING PLANT SPECIMENS

1.—SPECIMENS FOR IDENTIFICATION

By R. D. ROYCE, Officer in Charge, Botany Branch

PLANT NAMES and the naming of plant specimens are of fundamental importance in many branches of science, including agriculture. To the farmer, too, accuracy in naming poisonous plants and weeds, as well as fodder and pasture species, can save much trouble and expense, and may be responsible for avoiding heavy stock losses.

The most important requirement for the successful naming of a plant is a good specimen to work with. Too often, damaged or insufficient material is submitted to the Department of Agriculture, and while some of these specimens can be named with a fair degree of certainty and others with some doubt, the majority cannot be classified at all, until better material is made available.

Collection:

It is important that specimens submitted for naming should show as much of the structure of the plant as possible.

To be of maximum use a specimen should be at least nine to 10 inches long, show the arrangement and attachment of the leaves on the stem, and should carry a number of buds, flowers or fruits. Where possible all three should be included, as a complete series of these structures makes positive identification much easier. If only one is available, it should be forwarded with the attached leaves.

Generally speaking it is advisable to take at least two specimens to allow for accidents and to provide a duplicate set where required.

When selecting material for the preparation of a botanical specimen, many factors have to be considered. In the case of small herbs, the whole plant, including roots, should be taken. When specimens which have only one flower a plant are collected, a number of such plants should be gathered and treated as one. Grass specimens for instance, should be collected in this manner, so that they show the base of the plant, the roots and the barren stems as well as the flowering stem.

Specimens collected from trees or shrubs must be truly representative of the plant from which they come, and of course should carry at least one flower, preferably more.

Preparation:

When a botanical specimen from plant material collected in this way is being

prepared, some means of flattening and drying it out is necessary. Most farmers would send no more than half a dozen specimens at one time for naming. The preparation of these as pressed specimens is relatively easy. In most homes there is a pile of newspapers or magazines in one room or another and this pile is an ideal press for small numbers of specimens.

The plants are simply placed between some of the papers at the bottom of the heap and left for a week or so. Glossy papers must be avoided as they do not absorb the moisture from the leaves and flowers. At the end of, say, eight or 10 days the plants should be completely flattened and dried out. They should be numbered consecutively for ease of reference in the letter of reply, packed between sheets of cardboard, addressed and forwarded to the Botany Branch, Department of Agriculture, South Perth.

Description:

The value of these specimens can be greatly increased if a few notes concerning each plant are forwarded with the pressed material.

These notes should give details which are not readily obtained from the specimen itself. Such things as size of the plant, soil type in which it grows, associated vegetation, colour of the flower, locality and date of collection are important, and could assist materially with the identification.

Even more important when submitting specimens of exotic plants for naming, are such details as the country of origin, or the history of the plant, where the seed originated, and any peculiarity of the plant concerned. Under some circumstances a relatively poor specimen can be named with certainty, if full and detailed notes about the plant are available.

Lastly, it is most important that the name and address of the sender should be placed inside the parcel. If these essential details are only recorded on the outer wrapping of the parcel, as it so frequently is, it is comparatively easy to lose the identity of specimens when several are delivered to the Herbarium at the one time. The ideal arrangement is to include a covering letter in the parcel with the specimens.

2.—SPECIMENS FOR DISEASE IDENTIFICATION

By G. C. MacNISH, Plant Pathologist

PLANT SPECIMENS submitted to the Department of Agriculture for disease identification are referred to officers of the Plant Pathology Branch, and in most cases a rapid diagnosis can be made.

Often, however, the specimens arrive in such poor condition that diagnosis is difficult or even impossible.

Some specimens have arrived as a putrid or disintegrated mass of material enclosed in a plastic bag. Leaf material received has often become so parched and dry that it has broken into many small pieces.

In these cases it is very difficult, if not impossible, to diagnose the disease and to give advice on corrective or protective measures to be taken.

I would like to suggest several rules that can be followed, when forwarding specimens, which will help us to give you the correct and most rapid diagnosis of your problem.

1.—Send suitable material

Select material which is typical and, if possible, shows a range of symptoms from early infection to a late stage. If small enough, send the whole plant, including roots.

We suggest this practice of leaving the roots attached to the specimen because many foliage symptoms can be traced to diseases which attack the roots. On the other hand if the plant is too large, you could enclose a small parcel of root material along with the above ground parts for examination.

2.—Send adequate information

It is little help to enclose a small piece of paper with the specimen saying, "this plant appears to be dying". Enclose a letter with the specimen telling the whole story. We would like you to include the name of the plant, any changes you have seen in it, and conditions under which it has been growing.

Any additional information such as fertilisers used, chemicals applied, watering practices and the number of plants affected may also be valuable.

3.—Pack the specimen carefully

Packaging is very important, as it affects the condition in which the specimen arrives. Here a little imagination must be used, as it is impossible to lay down hard and fast rules for all contingencies.

Single leaves should be flattened and placed between layers of thick paper or cardboard, whereas cereals or grasses may be rolled in newspaper.

Succulent fruits should be wrapped with soft paper and packed firmly in a stout box to avoid bruising.

Roots with surrounding soil may be packed in a plastic bag, but when the whole plant is submitted only the roots should be enclosed in plastic and the rest wrapped in newspaper. In summer it may be advisable to make the inner layers of moist paper to help maintain the freshness of the specimens.

Send the specimens early in the week. Try to avoid having specimens, especially those of a moist nature, arrive late on Friday or during the weekend as this means they will spend several days in the post and will not be examined by the Departmental officers until Monday morning.

Lastly, send the material to the correct address. To ensure prompt attention forward your specimen to—

The Department of Agriculture,
Jarrah Road,
South Perth.

and mark on the outside of the parcel, "plant disease specimen."

DAMS

By D. G. CARDER, Adviser, Soil Conservation Service, Narrogin

THE ordinary excavated dam is usually considered a simple proposition but there is often more to it than just finding the clay and sinking a hole.

It is a pity that so often contractors and the farmers who employ them trust to eye judgment for the levels of a dam. Sometimes that judgment is good but sometimes the lowest part turns out to be the back wall or a back corner. This may mean that water goes over the top or at least that part of the excavation is wasted.

With a simple level, especially the water hose level, it is an easy matter to work out the levels of a site before construction begins, and to check that the back wall is high and level enough before the contractor leaves.

Most dams have been put in hollows or where water flows directly into them. This is not absolutely necessary. With a knowledge of the capabilities of diversion or contour drains, it is possible to put the dam not where the water is, but where it is wanted and where there is good holding ground. This may be necessary to avoid rock or salt.

Dams can be sited with the possibilities of contour drains in mind; drains can also be used to help fill existing dams, as long as they do not have to run across sandy country. These drains need a grade of up to one in 100. They are made in exactly the same way as ordinary contour banks.

The use of contour drains to fill dams is probably more suited to the over 14-inch rainfall areas. But they depend more on heavy showers than on total rainfall. They also need a fair slope on the land.

For the sake of economy, try the contour bank first. If it proves unsuccessful, a roaded or graded catchment can be used more or less as a last resort.

Single, straight-wall dams are becoming increasingly popular. On gently sloping sites they can often hold back several times as much water as the volume of the wall. But they have to be well planned and very carefully built.

You can't beat 'slip' completely . . .

WHEEL SLIP IN TRACTOR OPERATION

Everyone knows what wheel "spin" is—for example, when the rear wheels of a motor car spin around on mud or some other slippery surface so that the car remains at a standstill. Wheel "slip" is the same sort of thing in a less acute form. The car or tractor does not come to a complete standstill, but it travels forward a much shorter distance than it should for each revolution of its driving wheels. In such a case the wheels may be turning five times in order to move the tractor 50 feet along the ground when, if there were no wheel slip, four times would do.



WHEEL SLIP THEREFORE LEADS TO . . .

1. Waste of fuel.
2. Loss of power at the drawbar.
3. Excessive wear on tyres.

WHEEL 'SLIP' IS NOT ALWAYS OBVIOUS

Up to twenty per cent. wheel "slip" is not easily seen and many farmers think that wheel "slip" occurs suddenly. They regard wheel "slip" as unimportant until they can actually see it. This is far from the case. That twenty per cent. "slip" must be translated into fuel loss, work loss and horse-power loss from your tractor.



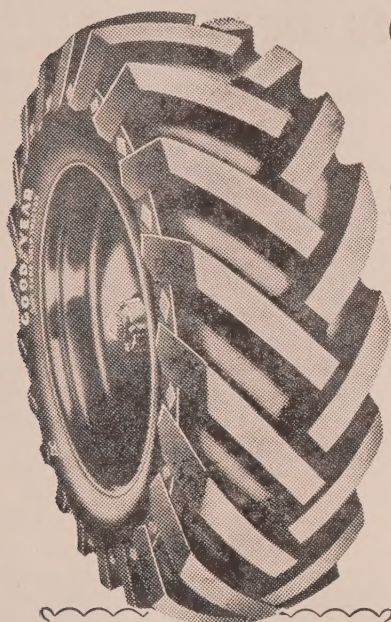
Effect of Modern Implements on Tractor Tyre Efficiency

Modern farm implements are increasing in size and efficiency, with the result that additional strain is placed on tractors and tractor tyres in their hauling operations. Even where free-rolling conditions are perfect,

"drag" by these heavier implements absorbs a certain amount of horsepower. This "drag" also places an additional impost on tractor tyres and, where treads are worn, creates excessive wear through slip when starting.

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BONUS 2. EXTRA STRENGTH. Goodyear's exclusive 3-T process triple tempers strong rayon tyre cord to make it triple tough; gives it tremendous resistance to impact breaks and bruises, keeps Super Sure-Grip strongly rugged all through.

BONUS 3. EXTRA WEAR. Super Sure-Grip has modern, stronger, longer wearing rubber compounds in both the tread and sidewalls. This flex-resisting, age-resisting and abrasion-resisting rubber assures extra long wear in all farming.



WEDGE-IN GRIP. Lugs are set closer at tyre shoulder than at centre. They wedge the soil between them to give the greatest pull on earth.



SELF-CLEANING OPEN CENTRE treads have no mud-trapping pockets. Lugs rise from ground leaving wedge-grip printed in the soil. They are clean for the next time around.



TOUGHER LUGS ARE STRAIGHT AS A RULER. Every square inch of pushing surface takes an active part in driving against a solid wall of soil.



REGULAR SPACING AND BALANCED DESIGN maintain momentum without jerking—give smooth ride even on surfaced roads.

GOOD YEAR SUPER SURE-GRIP

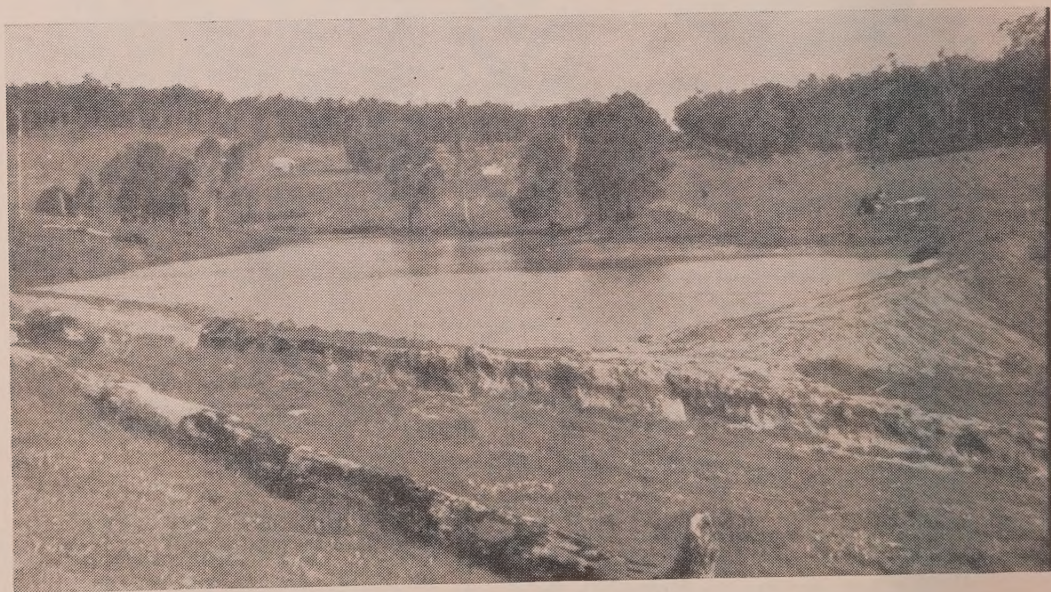
Not only has the clay to be a very sound one, but a good bywash or overflow is essential for safety. The bywash should be very wide, and be well grassed before water is ever likely to go over it. Also there should be no sharp falls for the water to go over, such as into a creek or gully; these will eat back and may cause a lot of damage that is hard to repair.

Provision of a safe overflow is often neglected for both single-wall and excavated dams. Contractors tend to put in V-shaped bypasses with the corner of the blade, instead of bypasses that are flat, wide and shallow. They also tend to take bypasses too far around the side, as if they don't believe that water will flow downhill by itself.

Another common source of damage is to crop across the hollow or slope below the dam where overflow water has to go.

To sum up, we can look at dams from four aspects:

- The catchment, which can be increased or improved by contour banks or by roading.
- The dam itself, which does not *have* to be put in a hollow where water runs, but can often be put where the water is wanted and where there is good clay. Water can be taken to the dam by contour drains (except across sandy country) or a roaded catchment. The dam and its bywash can be made more efficient and safer by the use of simple levels.
- The bywash should be wide, flat and shallow, especially so for straight-wall dams.
- A grassed waterway should be left out of cultivation all the way down the slope to take the overflow.



On farms where suitable dam sites can be found, many farmers are developing their own small irrigation schemes. This requires big dams such as this one, in the Donnybrook district. A farmer cannot afford to trust "eye judgments" when having such a dam constructed

Salty Seepages can be Productive

By C. V. MALCOLM, B.Sc. (Agric.)

MUCH has been said and written concerning the use of *Paspalum vaginatum* for growing on seepage areas, but the general production to be expected from seepage areas has not received much attention.

The fact is that properly handled, seepage areas can be quite productive, and can be valuable for summer grazing.

Reclamation:

Fencing is the first thing to consider in planning a reclamation programme.

Some seepage areas are quite extensive and may be readily fenced to form a good sized salt paddock. Some areas are small but with the inclusion of a limited amount of sound land a useful paddock may be obtained. Other areas are small or even large in total area but owing to their scattered or tortuous nature they cannot economically be fenced out.

It is best to regard seepage paddocks as special purpose areas. They are well suited for this, in view of their potential for summer green feed. Since most seepage areas are relatively small, seed, fertiliser, and cultivation costs are fairly low, and fencing is the main item of cost.

In some cases farmers have established *Paspalum vaginatum* and other plants during cropping years without fencing. Where the areas are limited and conditions well suited to the plants they will spread against subsequent grazing pressure. Quicker results are obtained and better

use may be made of seepage areas where fencing is possible.

Plants to grow:

There are several plants of value for growing in salty seepages, and others which may be planted in the near vicinity.

Where water is oozing from the soil surface during the summer the most suitable plants to grow are *Paspalum vaginatum*, tamarisks, and salt sheoak (*Casuarina glauca*).

The paspalum is a valuable grass which grows mainly in summer. It may be grazed very heavily once established, with no fear of being eaten out. The tamarisks and salt sheoak are of some value for grazing and are useful for shade and shelter as well as being of aesthetic value.

Moving from the soggy situations to those which are harder and merely remain moist or even dry out at the surface in summer, it is found that paspalum grows less vigorously. The trees mentioned may still be grown as may also the salt river gum (*Eucalyptus sargentii*).



The lush vegetation behind the fence is puccinellia, growing on a bare salty area adjacent to a very wet seepage patch. Fencing is the first thing to consider when planning reclamation of salty seepage areas



Tamarisk trees and *Paspalum vaginatum* have transformed this seepage area, on a farm near Brookton

Grasses which are likely to be valuable are *Puccinellia* spp. and *Agropyron elongatum*, both of which are being tested by the Department of Agriculture.

The winter growing puccinellia (perennial tussock grass) has done well in experimental field plots, and seed supplies are now being built up. Some seed of puccinellia should be available to farmers in a year or two.

Agropyron elongatum (salt wheat grass) is a spring and summer growing perennial salt tolerant wheat grass. It is used on salt affected areas in the United States.

In some relatively fresh seepage areas, usually of a sandy nature, very good results have been obtained from strawberry clover. This clover withstands waterlogging very well, is mildly salt tolerant, and being a perennial, avoids annual germination hazards. Areas suitable to its growth are limited but production is quite spectacular where conditions are right. *Paspalum dilatatum* may also be useful in such places.

Fresh Areas Included:

As was mentioned earlier, it is sometimes desirable to fence in some sound land with the salt in order to boost paddock size or to avoid awkward fencing. Since the salt tolerant plants recommended are perennials, it is necessary to apply appropriate grazing management over the whole paddock, and advantage may be taken of this fact by including some perennial plants in the fenced area on sound land.

Immediately up slope from most seepage areas there is a shallow supply of relatively fresh water. Depending on the soil type and the depth of water, a number of plants are able to take advantage of this situation. Useful plants are lucerne, perennial veldt grass, couch grass, kikuyu, and tree lucerne.

Utilisation:

From what has been said it will be realised that seepage patches can become an asset. It has often been said that in fencing a salt patch, you lose nothing because you're getting nothing off it. Perhaps a more optimistic view may be taken: That an area giving no production may be converted to an area producing good quantities of off-season green feed.

When should seepage areas be grazed?

Since the plants are perennials, seed production need not be considered. The plants are probably best grazed in summer and autumn, which is the time of year when they are most likely to be of use. It is inadvisable to graze salt areas to the degree where any soil is bared as reclamation of such patches is troublesome.

No evidence is available concerning the effect of fertilisers on plants growing in seepage areas. However, the plants involved respond to fertilisers when grown in the nursery, and field trials are in progress to determine benefits from adding superphosphate and ammonium sulphate to *Paspalum vaginatum* in seepage areas.